Techno.

CANADIAN TEXTILE JOURNAL

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The YORKSHIRE WOOL STOCK MILLS, ALMONTE, Ont.

Manufacturers of Pulled and Carded Shoddies.

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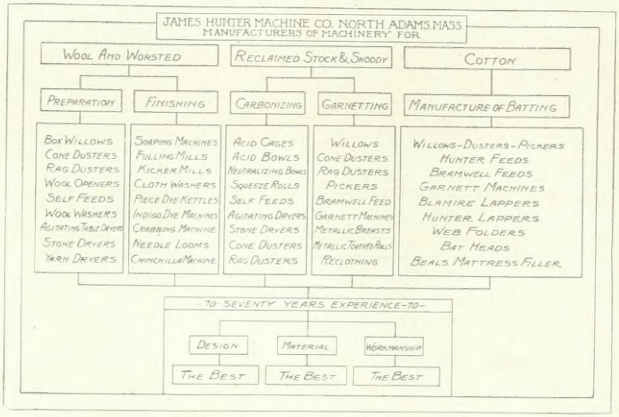
SEND A TRIAL SHIPMENT AND SEE HOW IT SHOULD BE DONE!



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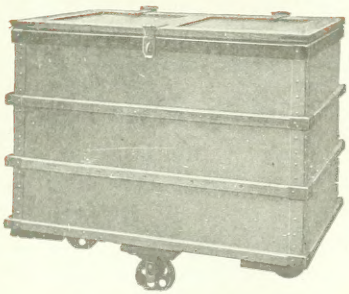

A Standard Truck.

equipped with Fibre-Panelled Hinge Cover.

These trucks serve as a part of the equipment in textile mills department stores, factories, hotels, warehouses and mail order houses where it is necessary to have a cover with hinge and hasp so that the trucks can be locked or contents be protected from dirt, dust, etc.

Barrels — Baskets — Mill Boxes — Doffing Cars — Roving Cans — etc.

Here are some of the reasons why Diamond Fibre Receptacles give superior service under all conditions.

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will not crack, dent, splinter or corrode — is exceedingly strong yet lighter than aluminum — impervious to oil and grease — sanitary and easily cleaned — fire-resisting — smooth and flawless surface protects contents from injury.

When ordering receptacles

Always Specify

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Send sketches for estimates on any special style of receptacle. Catalog describing our regular lines sent on request.

Diamond State Fibre Company of Canada Ltd

Head Office and Works:

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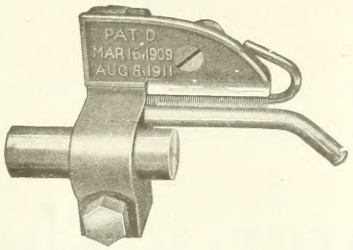

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MacColl Patent Spooler Guides
or Slub Catchers

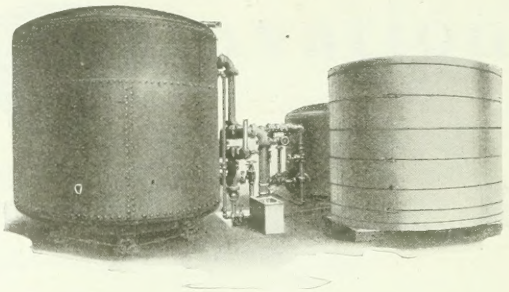
in use up to January 1922

Adapted to both Cotton and
Worsted Yarns

DRAPER CORPORATION

Atlanta Georgia Hopedale Massachusetts

How a Well Known Mill Eliminated Its Boiler Troubles



A CERTAIN textile mill in Indiana had always experienced more or less trouble in their boiler plant, which was a source of constant expense and annoyance to the company. They operated two 500 H P and two 300 H P Heine Safety water tube boilers, developing 1600 BHP at normal rating. The water supply which is derived from two artesian wells 155 feet deep, is clear and clean though it contains an average hardness of about 18 grains per gallon.

For many years they softened this water supply by the lime-soda process, which reduced the total hardness to about 6 grains per gallon. In spite of this fact, however, scale continued to form in the boiler tubes, necessitating a constant cleaning gang at work, besides numerous tube replacements, repairs and occasional boiler shutdowns that were very costly. The partially softened water too was not altogether satisfactory in their dyeing and other textile processes, causing frequent re-dyeing and rejections that ran into considerable money.

At last, determined to rid themselves forever of these many manufacturing difficulties they made a thorough investigation of all the best known methods for softening their water supply which resulted, in August 1917, in the installation of a Permutit Zeolite Water softener that removes the entire 18 grains of hardness. This apparatus delivers 80,000 gallons daily of absolutely zero soft water for the boilers and all manufacturing processes. The resulting improvement were quite astonishing.

The formation of scale, sludge and mud in boiler tubes stopped immediately and within a month they laid off their cleaning gang permanently. Boiler tube replacements and repairs simmered down to practically nothing, at all, while boiler shutdowns due to ruptured tubes or similar troubles are now absolutely unknown, and they have saved a lot of fuel.

In their dyeing and other processes where the zero water was used, considerable improvement was evidenced at once, and their re-dyeing and rejection losses have been reduced to an almost unbelieveable point.

The entire mill operates better than ever before. They have saved many hundreds of dollars in fuel, repairs, cleaning, labor and interrupted service, and improved processing conditions have put several thousand dollars in their pocket.

What about YOUR boilers — YOUR manufacturing processes? Let us help you to investigate as this mill did — no obligations. Write today.

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Send for this free booklet

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Please send me your free booklet, **"Permutit in the Textile Industry."**

name .....

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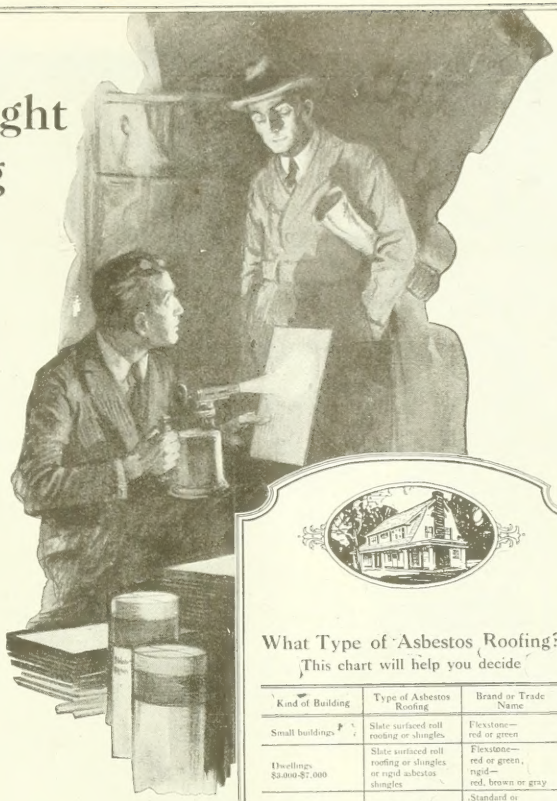
"—but I always thought Asbestos Roofing too expensive"



As a matter of fact, Asbestos Roofing is the most economical of all roofings. For actual roofing cost must be figured on a per year basis—not on its initial cost—and the roofing that lasts the longest without upkeep and repair cost is the cheapest.

When you roof with Johns-Manville Asbestos—of whatever type—you have roofed once and for all. The first cost is the only cost.

Meets every building requirement

Johns-Manville Asbestos Roofing found its first market among the big industrials because the trained buyer was the first to realize its ultimate economy, not only in its reduction of fire risk but also in durability.

But the demand for those same qualities in a roofing suitable for residences and small buildings has brought about the development of Johns-Manville Roofing in roll and shingle types to meet the requirements of any building at a price consistent with the building's total cost.

Different from any other roofing

Asbestos is entirely different from any other roofing material.

An asbestos roof is a mineral roof, unaffected by time or weather, needing no paint or protecting surface, free from the danger of falling sparks, and yet rivaling in appearance the usual kinds of roofing that habit only has taught us to regard as standard.

The roofing chart on the right is for your convenience. It will guard you in determining the right type of asbestos roofing for any kind of building.

Fire-Safe—
Look at this

Any one of the Johns-Manville Asbestos Roofings will withstand the severe heat of the blow-torch. Make this convincing test, yourself.

Johns-Manville Asbestos Roofings are given highest ratings by Underwriters' Laboratories, Inc.

What Type of Asbestos Roofing?
This chart will help you decide

Kind of Building	Type of Asbestos Roofing	Brand or Trade Name
Small buildings	Slate surfaced roll roofing or shingles	Flexstone—red or green
Dwellings $3,000-$7,000	Slate surfaced roll roofing or shingles or rigid asbestos shingles	Flexstone—red or green; rigid—red, brown or gray
Dwellings $7,000-$23,000	Rigid asbestos shingles	Standard or extra thick—red, brown, gray or blended
Dwellings $23,000 upwards	Rigid asbestos shingles	Colorblende—five-tone, brown with or without red or gray accidentals
Factories, shops and mills—Monitor and Sawtooth roofs*	3 or 4-ply roll roofing	Johns-Manville Asbestos Ready Roofing or Built-up Roofing
Flat roofs—all buildings*	Built-up roofing	Johns-Manville Built-up Roofing
Skeleton frame buildings—standard conditions*	Corrugated asbestos roofing with steel reinforcement	Johns-Manville Corrugated Asbestos Roofing
Skeleton frame buildings—excessive temperature or condensation conditions*	Corrugated asbestos roofing without steel reinforcement	Johns-Manville Transite Corrugated Asbestos Wood Roofing

*Note—Industrial buildings call for expert advice. A roofing expert is available at all Johns-Manville Branches.

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and its allied products
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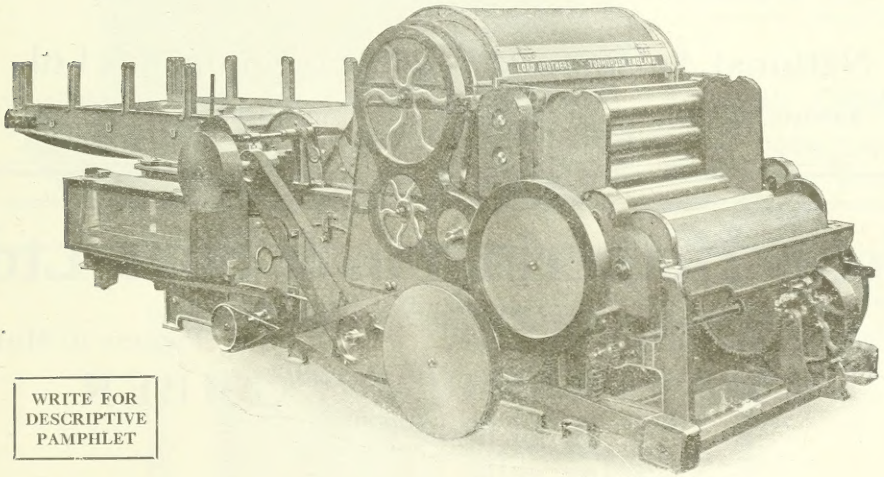

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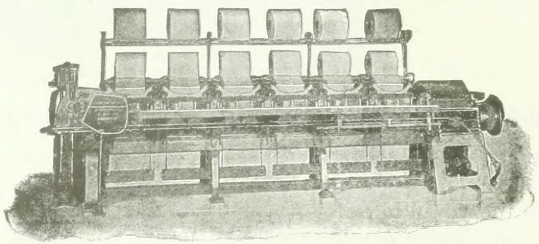

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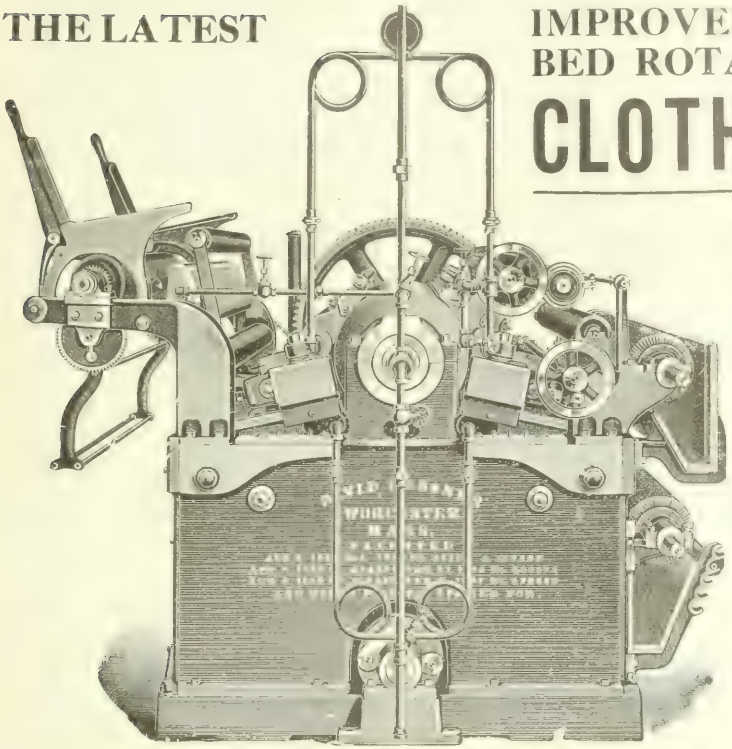

The bed plates are self adjusting the levers that operate them being mounted upon sliding steel fulcrum bars within the frames. The trussing apparatus of the bed plates is so arranged as to permit not only a forcing of the centres of the bed plates in a forward direction, toward the cylinder, but also away from it, which is of the utmost importance if the bed plates should ever become sprung. Bed plates and cylinder after being cold finished, **are ground absolutely true while heated by steam at 75 lbs. pressure insuring perfectly straight and uniform pressing surfaces.** Pressure is applied and removed instantaneously, and by power.

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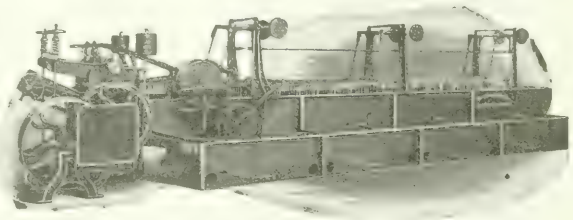

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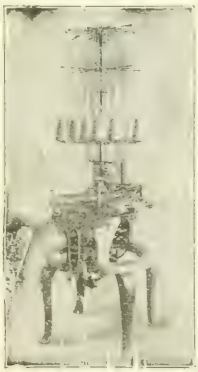

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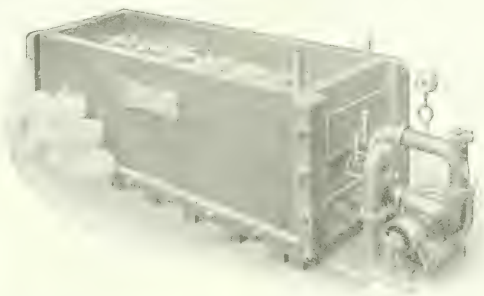

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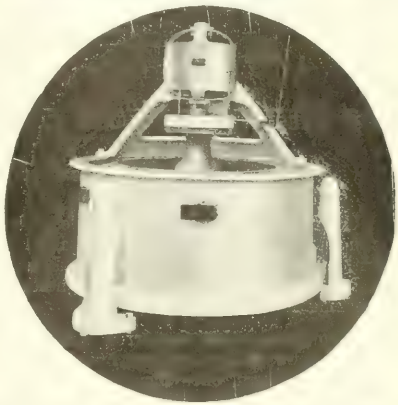

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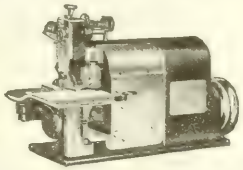

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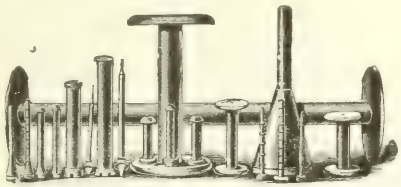

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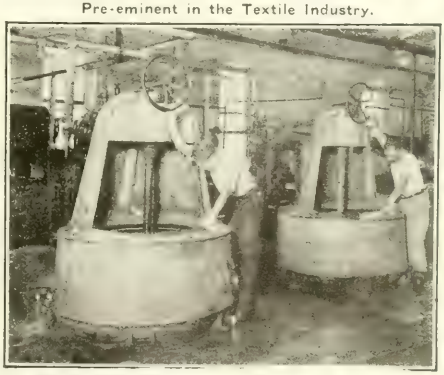

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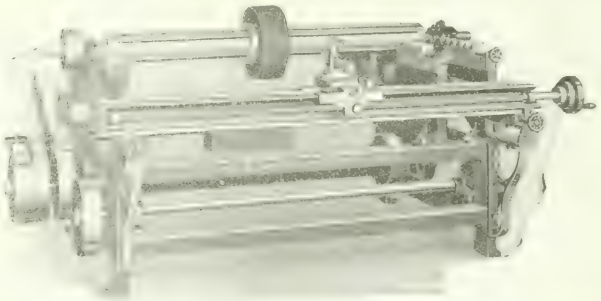

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CANADIAN TEXTILE JOURNAL

An Educational Periodical, published Fortnightly, for the dissemination of Technical Information, with a Commentary and Review of the News and Conditions of the Textile Industry in Canada

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PRINCIPAL CONTENTS

Editorial.

The Best Policy 101

Branch Plants In Canada 101

The Uses Of Advertisement 102

Business Is Better 102

Editorial Notes 103

Special and Technical.

The Cotton Boll Weevil 104

How The Foreign Exchange Market Operates . . 107

The Preparation Of Color Pastes 108

Roving And Spinning Machinery 110

Electrical Drive In Cotton Mills 112

The Irish Linen Position 114

Technical Control Of Textile Manufacture 116

General.

Jacob K. Altemus 103

Toronto District Conditions 106

Penmans Orders Advance 109

Faults In Canadian Wool 111

Sentiment More Cheerful 113

Manila Hemp Market 118

Bad Fire Losses In 1921 118

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Supplying 95% of the country's needles is no little accomplishment—but we're much prouder of having held the business of many of our customers—without interruption—for more than a quarter century.

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EDITORIAL

THE BEST POLICY.

A fortnight ago, in congratulating those responsible for the Textile Products Exhibition, recently held in Toronto, on the success of that exhibition, and in expressing our conviction that substantially beneficent results to the Canadian textile industry at large may be expected to accrue therefrom, we took occasion to emphasize the necessity for the "Made-in-Canada" movement, whether as regards textiles or other lines of manufacture, to adhere to a supreme standard of quality. Though writing with special reference to the textile industry, it was far from our meaning to imply that those engaged therein need more than those engaged in other lines of manufacture to be cautioned in this regard.

But none who are engaged in commercial and industrial life can fail to be aware that there are men in every trade and calling who are lax about business standards—men who do not appreciate the value of a good reputation. There are not more of these in the textile industry than in any other—indeed, we are inclined to think that there are fewer of them in that industry than in some others. But human nature does not vary to any great extent. Many — perhaps most — of us are apt to become careless, even though we have no intention of deviating from the strictest standards of quality and value in the work that we turn out.

We need to remember not only that reputation for quality may take a long time to build up, but also that it can be lost far quicker than it can be gained. This latter fact makes it all the more important that the policy of rock-like adherence to the utmost in quality of products should be steadily and steadfastly pursued. To put it on the lowest grounds, a manufacturer simply cannot *afford* to destroy, or impair, a high reputation, which it has, perhaps, taken him years to acquire, for the quality of his products. His investment in the goodwill and respect of the consuming public is one which cannot fail to yield him, in the long run, liberal dividends.

BRANCH PLANTS IN CANADA.

It seems unquestionable that British manufacturers are not fully appreciative of the advantages of establishing branch plants in Canada. In such circumstances, the Department of Trade and Commerce has recently decided to concentrate its efforts to induce industrial executives of the United Kingdom to consider the Canadian field as a scene of operations. With that aim in view a booklet has been prepared by the Department of Trade and Commerce presenting information about Canada's resources, transportation systems, labor conditions, and industrial possibilities.

In sharp and significant contrast with the neglect of Brtiish manufacturers to locate in this country has been the alacrity with which concerns in the United States have opened up branch plants in Canada. At the present moment, there are something over 700 branch plants which have been established in this country by parent companies in the United States. Most of these have been located here just within the last few years, and their number is being added to almost daily.

Why should British manufacturers be slower than their competitors in the United States to avail themselves of the advantages which Canada offers to industrial undertakings? Well, in the first place, it must be remembered that many manufacturing concerns in the United States, in establishing branch plants in Canada, have been actuated by a desire not only to handle the great and growing Canadian market at close range, but also to circumvent the Canadian tariff and to get the advantage of such preferential trade arrangements as already exist, or may hereafter be made, between the various component parts of the British Empire. With the British manufacturer the case is different. Under preferential tariff arrangements, he already has access to Canadian markets without the necessity of establishing a plant in Canada.

But, above and beyond this, we expect that the propinquity of Canada to the United States has constituted one highly important reason why manufacturers in the latter country have been more eager than have their British rivals to establish themselves industrially here. It has been easier for them to get on the ground quickly, to size up conditions and to gauge opportunities.

Again, it is easier for industrialists from the United States to adapt themselves to Canadian methods and conditions of manufacturing than it is for those from Great Britain. Constant contact enables firms from the United States to accommodate themselves both more easily and more quickly to the Canadian market than is the case with British firms. And the question of ability to adjust themselves to the Canadian viewpoint

is obviously one of prime importance so far as the ensuring substantial success is concerned. It is undeniable that the difference between the British and the Canadian view-point has, in the past, militated—and somewhat seriously—against the success of British concerns which have located here. The problems that confront a British manufacturing firm locating in Canada—whether in connection with production or in connection with distribution—are not, in many respects, the same as the problems with which he has been made familiar in his own land. And, too often, perhaps, with the proverbial tenacity of his race, he has displayed a tendency to transplant here, lock, stock and barrel, the methods to which he has been accustomed in his own country.

However, difficulties such as these can be, and should be, surmounted. Alike for skill in manufacture and for soundness of workmanship, the British manufacturer cannot be excelled. In Canada we need outside capital to develop both our natural resources and our industrial opportunities. That being so, it is obviously desirable—and on more grounds than one— that, if possible, we should obtain it from Great Britain. For that reason, we trust that the efforts of the Dominion Government to interest industrial executives in Great Britain in the Canadian manufacturing field will be crowned with success.

There is every evidence of a growing realization among British manufacturers of the increasing importance of the Canadian market, both present and potential. The delegation of the Scottish Woollen Trade Mark Association which was recently in this country, and which visited many of our industrial centres, was undeniably desirous of securing part of the Canadian market as an outlet for the British woollen trade. But, as we took occasion to point out at the time, the tariff which Canada maintains, and, as we expect, and, indeed, hope, will continue to maintain, against imported woollen goods, dooms any such hope, on the part of Old Country textile manufacturers, to disappointment, save in so far as they may care to establish themselves here by opening up plants in this country. For our part, we want to see the outside capital which Canada needs to develop her industrial opportunities, no less than her natural resources, supplied from within, rather than from without the confines of the British Empire. We believe that to be the wish of the great majority of Canadians. And we conceive that it is now up to British manufacturers, desirous of securing a slice of our markets ,to come and establish themselves among us as part and parcel of the industrial fabric of this twentieth century country.

THE USES OF ADVERTISEMENT.

During the period of booming prosperity which both preceded and followed the Armistice, most Canadian business houses advertised enormously. Yet, at that time, orders were coming in practically of their own accord. In the period of subsequent depression through which we have passed, and are, indeed, still passing, very many of these self-same business houses have cut down their advertising with an axe, as it were. In other words, at a time when orders, instead of coming in of their own accord, need going after with all the vim and vigor available, they are letting up on their salesmanship.

In all probability, nine out of every ten business men are ready to assent to the statement that advertising is an essential of present-day business, and even to the further statement that it is more essential when orders are hard than when they are easy to get. Yet so widely does practice often differ from theory that many a man who is ready to profess himself a firm believer in the uses of advertisement will be among the first to chop and lop his advertising appropriation until he makes it (and, in some cases, almost literally) look like thirty cents. Then he proceeds to grouch about bad times, seemingly oblivious of the fact that these bad times are, in part at least, due to his not advertising effectively, in other words, to his having let up on his salesmanship.

There should be little need to dilate on the short-sightedness of such inconsistency. Indeed, many a business man is conscious of it, and, if he were candid with himself, would probably admit that he has cut down first on his advertising, when the need for retrenchment has made itself plain, because that has been the line of least resistance for him to take. Other economies, however urgent, would, very likely, have put him to more personal inconvenience. So he has chosen a policy of almost patently false economy.

Yet, again, there are other business men who persistently allow the glamor of big general circulations to blind them to the concentrated buying power possessed by the readers of journals which make no such boast. It is not the number of a paper's readers — it is their buying power — that brings results to an advertiser. Small circulations with no waste are incomparably better advertising mediums them huge circulations with an inordinate amount of waste.

BUSINESS IS BETTER.

There has been, of late, quite a sensible improvement in business, so far as many branches of the textile industry are concerned. As regards cottons, the mills are reported to be busy, and some, in fact, are behind in their deliveries. Linen goods are reported to be firm, with a good demand and an upward price tendency. There is an increased demand for certain lines of woollens, including fingerings and fancy yarns, and here again some mills are reported to be behind in their deliveries. Some lines of silks have advanced in price, and, generally, the price trend is upward. The demand for silk hosiery is particularly good.

In many lines, a good volume of business is already being done, while in others conditions are improving. Stocks in the hands of retailers are, generally speaking, light and the outlook for spring business is distinctly encouraging. On the whole, it certainly looks as though we are now approaching a period of more active buying.

EDITORIAL NOTES.

Textile Industry in Czecho Slovakia.

There are 1,530 textile factories in Czecho-Slovakia, of which 686 are devoted to the manufacture of cotton, 251 to wool, 171 to flax, 53 to silk, 240 to hosiery (or knitted goods), 20 to carpets, 42 to thread, and 54 to the manufacture of ribbons, employing more than 700,000 hands. To keep only the cotton mills fully occupied some 710,000 bales of raw cotton would have to be imported annually. Of this quantity about 35 per cent. is essential for the requirements of 13,500,000 inhabitants of the Republic, while the remaining 65 per cent would be available for export. The largest factory is in Ruzomberk, and is equipped with 156,000 spindles. Cotton production in Czecho-Slovakia is only about 20 per cent of the pre-war production, due to the insufficient supply of the raw material, and this, again, it is asserted, is the result of the high rates of exchange in countries possessing stocks of cotton.

Wool Freights in New Zealand.

The High Commissioner for New Zealand has received from his Government a notification of a reduction of ¼d. per pound in the rates of freight on wool from New Zealand, making the present rates 1d. per lb. for greasy and 1¼d. for scoured and slipe wools, all plus 10 per cent. primage. The rtduction dates from the 16th ult.

German Dyestuffs for Britain.

German trade statistics have been asked for in the Imperial Parliament a couple of weeks age. Mr. Hilton Young, replying to a question, said the total weight of dyestuffs received by this country from Germany by way of reparation up to December 31 last was 4,070 tons, in respect of which approximately £570,000 (or £140 a ton) was credited to Germany. Two thousand four hundred tons have been sold for approximately £381,000, after the deduction of expenses of realisation (or £228 a ton), which, therefore, represents the value ruling at the dates of sale.

Wool from South Africa.

Exports of wool from South Africa during the eleven months ended November totalled 10,002,246 lb. of scoured, against 12,194,841 lb. in the corresponding period of 1920, and 187,841,524 lb. grease, against 95,017,146 lb. in the eleven months of 1920.

JACOB K. ALTEMUS.

This well known textile machinery concern makes a special announcement.

Jacob K. Altemus, the well known concern manufacturing textile machinery such as winders, spoolers, warpers, beamers and kindred machinery announces that it is now in full operation at its new location, 2624 North American Street, (below Lehigh Avenue) Philadelphia, Pa., where it has trebled the capacity heretofore used at its old plant which has been used for forty years and is able to construct as many as 30 winders a week.

The demand for its patented Automatic Builder Winder, a machine for the positive builder that permits the interchange of any size cone from 5" diameter base to 3" base without any adjustment of the mechanism that winds silk soft or in gum, fibre silk in grey or dyed, cottons of all kinds, merino and worsteds, all from the skein or cops, is the result of a desire for higher knitting efficiency, to eliminate tight and loose stitch, to produce a uniform knitted fabric and save press-offs and seconds.

The object is to produce a perfect wind to avoid loss of fabric in process. Its productive advantages make it an object of vital interest to manufacturers of full fashioned hosiery, seamless hosiery, underwear of all grades, ties, mufflers and worsted and woollen fabrics —all come in for a share of economy in the art of winding by the new and valuable methods of building the yarn.

Through a better understanding of the mechanical features Jacob K. Altemus can demonstrate that, while the machine costs more to build than the Cup-Builder Winder, the saving through the use of the Automatic type will pay for itself in six months' time. Further, the cones it uses and to produce the effect. While it is possible to wind onto bottle-bobbins on the Patented machine, the difference in the freedom of the yarn let-off of the cone compared with the bobbin and the superiority of the method will be readily appreciated. Jacob K. Altemus awaits inquiries for full details and trusts that the trade will give its plan its early consideration.

The 2-B Cone Winder, for which Jacob K. Altemus is renowned handles artificial silk, cotton and worsted and winds from the skein. It is a winder that produces results, it saves money and earns money by the use of the winding and swifts revolve at 150 revolutions per minute.

It is the machine par excellence to produce the wind that eliminates tight and loose stitch, press-offs and seconds and makes a flexible smooth, equal and uniform fabric and permits high speed of the knitting machine as calculated to operate.

AMERICAN WOOLLENS EARNINGS.

New York, March 7.—The annual report of the American Woollen Co. for the year 1921 shows net earnings of $6,006,648, after reserves for taxes and contingencies and the setting aside of $3,185,973 for depreciation. This amount, after allowing for the regular dividends of 7 per cent. on the preferred stock, left a balance which was equal to $8.01 a share on the $40,000,000 common stock outstanding at the close of last year. In 1920 the company reported net earnings of $4,626,855, which, after preferred dividends, was equal to $4.57 a share on the same amount of stock.

The Cotton Boll Weevil

Extracted from "Commerce Monthly" of New York.

During the cotton season of 1921 the depredations of the boll weevil covered practically the entire cotton belt. All southern cotton-growing states are now face to face with the most destructive insect pest that ever threatened a major agricultural crop. The results of this invasion are of utmost importance, not only from the standpoint of the future economic development of the South, but also because of their indirect bearing on the cotton textile industry of the world.

The cotton boll weevil, usually known as the "Mexican cotton boll weevil," migrated from Mexico across the border into the United States near Brownsville, Texas, in 1892. The adult weevil is a grayish or brownish beetle, about one-fourth of an inch in length. It hibernates in the adult stage, and in average years about 6 per cent. of the insects that hibernate survive the winter. The female lays eggs, first in the "forms" or "squares" of the cotton plant, which precede the blossoms, and later also in the green bolls.

Under normal midsummer conditions the eggs hatch in about three or four days. The grubs feed on the interiors of the squares or bolls from six to twelve days and then pass into the pupa state, which lasts from three to five days, when they emerge as adult insects. The females continue to lay eggs for a long time, the average period apparently being over forty days. A generation occupies from three to four weeks, the time depending on the temperature. It is thus obvious that after the weevil enters an area infestation may become complete in a very short time. It has been estimated that if no eggs or pupae were destroyed the progeny of a single pair of weevils would number more than 12,000,000 in a season.

There is a definite period of migration, beginning from August 1 to September 1 and continuing until frost, when the insects fly from the fields in all directions. Although weak flyers, proceeding by repeated short flights, weevils have been known to travel long distances, and the wind aids in their dissemination. This is undoubtedly the main method by which the infestation has spread, although the insect can also be carried in cotton and cotton seed.

By the time it was first brought to the attention of the Department of Agriculture in 1894, the boll weevil had spread through a half dozen countries in southwestern Texas. Since that time,despite various efforts to stop it, its spread has been continuous at an annual rate ranging from forty to one hundred and sixty miles, though in years when adverse weather conditions prevailed it has occasionally been driven back. The accompanying map shows the extension of the infested area, from the beginning of the invasion to the close of the season of 1921 as reported by the United States Department of Agriculture. A large part of the cotton area of Mexico is also infested, and the weevil is known to occur in the coton areas of Guatemala, Costa Rica and the eastern half of Cuba, but it has not been reported from other cotton-growing areas of the world.

The major part of the damage to cotton infested by the boll weevil is due to the fact that the developing grubs cause the squares to drop off or "shed," while the larvae in the green bolls cause them either to fall or to fail to develop further. As the proportion of boll weevils which survives the winter is relatively low, up to midseason the shedding which results from weevil infestation is not likely greatly to exceed the normal shedding of the plant. As the season advances, however, the increase in the number of weevils is so rapid that not only are all new squares infested, but the young bolls are attacked. It is at this stage that the boll weevil becomes highly destructive to the crop.

It is extremely difficullt to determine the extent to which the cotton yield in any specified area is permanently reduced by the presence of the boll weevil. According to government authorities who have worked in the struggle against the pest, infested communities as a rule go through a rather similar cycle of experiences. In the first year of the appearance of the weevil in a new locality it usually does little damage. In the second year it becomes serious, and in the third year a portion of the crop is abandoned. By the fourth year the planters have made some progress in their fight against the insect, and in the fifth year cotton growing is fairly well reestablished.

From the standpoint of the future of cotton growing in the southern states, it is obvious that the influence of the boll weevil must be measured in terms of permanent effects on yield, rather than on the effects when a serious invasion is faced for the first time. In every year weather conditions are also a determining factor, and during the year just closed the limited amount of fertilizer used also affected the crop. Although statistics of the cotton crop as a whole indicate little as to the effects of the boll weevil in relation to yield, it is of interest to note that according to the United States Department of Agriculture the average yields per acre for the five-year periods ending in 1905, 1910, 1915 and 1920 were 194, 189, 202 and 169 pounds of lint cotton respectively. In 1921 the average yield per acre was 127 pounds.

The presence of the weevil has created conditions so different from those prevailing prior to the invasion that comparisons of yield, even in limited areas, are inconclusive. The outstanding fact is that if the weevil is not controlled cotton growing in boll-weevil territory becomes impossible . It is too late to attempt to check the spread of the weevil, and indeed such attempts in the past have been proved utterly futile, as the practically complete infestation of the cotton belt amply proves. Efforts are therefore necessarily directed, first, toward control and second, toward eradication if possible.

The best and cheapest method of control which has thus far been developed is poisoning by means of calcium arsenate. By this method the weevils are left undisturbed until from 10 to 15 per cent. of the squares are infested. The plants are then thoroughly dusted with calcium arsenate, which destroys only the adult insects. The process is repeated so as to keep the plants well dusted until the weevil is under control. This usually means about three applications at intervals of four days but rain may make additional applications necessary. If after this the weevils again become abundant enough to injure the young bolls, one or two applications later in the season may become advisable. From 5 to 7 pounds of calcium arsenate per acre are required, and it is essential that it meet exact chemical specifications as to purity, as the presence of certain forms of arsenic may injure the plants.

The cost of dusting with calcium arsenate, including

the cost of the material, labor and depreciation on equipment, is such that the United States Department of Agriculture does not advise it unless the land is good enough to justify expectation of a yield of at least one-half a bale per acre, if the weevil is eliminated. It is further stated that while general gains from weevil poisoning under fairly favorable conditions seem to be from 200 to 400 pounds of seed cotton per acre, it is not safe to expect more than the lower figure; and that poisoning with calcium arsenate is not advisable if the cost will total more per acre than the current value to 100 pounds of seed cotton.

Successful poisoning supersedes all other methods, as it is the cheapest and most efficient when a farmer has the proper equipment and has learned to use it. However, success in poisoning depends on precision as to details, beginning with purity of chemicals and accuracy of judgment as to when to start poisoning. To date there has been some difficulty as to adequate supplies of good calcium arsenate, while equipment has been expensive and not always easy to get. While it seems likely that ultimately other methods of control may be practically abandoned in favor of weevil poisoning, as yet they can not be disregarded.

Regardless of whether or not poison is used, certain other principles of handling the cotton plant in the presence of the boll weevil must be observed. The land must be well drained—upland and lighter soils are therefore preferable—and the farmer must not put any more of it under cotton than he can care for well. Under boll-weevil conditions much more labor is required than before infestation. Reduction of acreage by one-half is necessary with plenty of cheap labor available. If there is any doubt as to an adequate labor supply it may become necessary to limit the acreage still further. Attention must be given to many details regarding the clearing of the land in the fall, proper use of fertilizer, choice of varieties of seed, with emphasis on early varieties, plowing, early planting and picking, conforming in each case to practice found by study and experiment to be most effective in combating the pest.

Such progress has been made in methods of fighting the insect as to offer fair assurance that it may yet prove possible to grow as much cotton per acre under boll-weevil conditions as before the invasion, but production under the new conditions is much more costly than under the old. The labor cost of the methods necessary to control is so great that a permanent reduction in the acreage planted to cotton in the United States seems inevitable.

The destructiveness of the boll weevil and the difficulty and cost of combating it make clear the grave consequences of the invasion of this insect on the economic future of the cotton states. Not only every farmer but very banker and business man in the cotton belt is obliged to consider the weevil in formulating his course of action. Not all of the results of the destructiveness of this insect have been bad. There are ways in which the cotton states have benefited, but whether the sum of effects is good or ill a new system of agriculture must be faced. In important sections the transition has already been made. Before the coming of the boll weevil southern agriculture throughout its history had been based on the one-crop system, and since the invention of the cotton gin that crop had been cotton. Wherever practised, a one-crop system, regardless of what that one crop may be, results in land impoverishment and subjects an agricultural population to such financial hazards as to make sound economic conditions impossible. Prior to the coming of the boll weevil, the South not only bought immense quantities of commercial fertilizer, but it also bought a large part of its food supply, whereas wherever diversified farming is practised commercial fertilizer is supplemented by the use of legumes and cover crops, a large part of the soil fertility removed by the growing of crops is restored by feeding them to live stock, and the farmers grow the major portion of their food.

In those parts of the South where the weevil is well established and has been most destructive, the lesson has been learned. A country seat in Alabama has raised a monument to the boll weevil, because the community is at last on a sound economic foundation, as a result of the abandonment of the one-crop system. In northern Florida, in parts of Georgia and elsewhere in the areas of earlier infestation, corn and hogs, peanuts, alfalfa, beef cattle and dairy cows, sweet potatoes, soy beans and other crops are to some extent replacing cotton. It is true that as measured by the actual acreage, statistics indicate that in the aggregate diversification has been but little increased. Table A, prepared from official data of the United States Department of Agriculture, shows for the last three years acreage in cotton and other leading crops for the ten southern states which make up nearly the entire cotton belt.

Table A—Crop Diversification in Ten Southern States

Crops	1919		1920		1921	
	Acreage	Per cent of Total Acreage	Acreage	Per cent of Total Acreage	Acreage	Per cent of Total Acreage
Corn	27,181	32.9	27,970	33.4	31,075	36.9
Wheat	8,450	10.1	6,030	7.2	6,852	8.1
Oats	4,956	5.9	4,700	5.6	5,401	6.4
Barley	155	.2	194	.2	200	.2
Buckwheat	6	.01	6	.01	5	.01
Rye	125	.1	111	.1	105	.1
Potatoes	283	.3	291	.3	297	.4
Sweet potatoes	756	.9	805	1.0	874	1.0
Hay	6,183	7.4	6,221	7.4	6,550	7.8
Tobacco	670	.8	754	.9	589	.7
Rice	908	1.1	1,174	1.4	776	.9
Peanuts	991	1.2	1,042	1.3	1,054	1.2
Total, above crops	50,964	61.1	49,298	58.9	53,778	63.9
Cotton	32,439	38.9	34,456	41.1	30,360	36.1

Returns as to acreage made to the United States Bureau of the Census in 1909 and 1919 for Texas, Louisiana, Mississippi and Alabama are equally inconclusive. The fact remains, however, that whether or not the decreased cotton acreage of 1921 is to be taken as an earnest of the future, production of food for home consumption has greatly increased in the South. Packing plants are springing up, and the farmer who once bought his pork at the general store from the proceeds of his cotton is selling his hogs for cash, and is likewise buying his household supplies for cash. Kitchen

* Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Texas.

gardens are the order of the day. Cattle are improving in quality, and many farmers are testing various new crops in small acreages.

The southern farmer will not permit the boll weevil to drive him out of the business of growing cotton. He will diversify his crops somewhat, meanwhile gradually learning effectiveness of weevil control, growing only as much cotton as he can handle profitably under the more arduous conditions of production which he now faces. The transition will inevitably strike at the roots of southern economic life, however. Diversified agriculture requires skill, not only in the mechanical features of the handling of varied crops, but much more in farm management, including that of live stock. The social effects of these new requirements cannot be foreseen, but whatever they may be the southern states are rich in potential agricultural possibilities, and it is not unlikely that they are just about to enter upon their real prosperity.

The invasion of the boll weevil into the American cotton belt will have an effect on the price of cotton throughout the world. This area has normally produced about 65 per cent. of the total cotton supply. Any factor which adds greatly to the cost of production of a basic commodity inflicts an economic loss. The American farmer will continue to produce cotton. How much he will produce will depend on the effects of better methods in the face of new conditions. Whatever the ultimate effects of the weevil on the total American crop may be, that crop will apparently be produced at a considerably higher cost.

The world's supply of cotton and the ultimate working out of the situation in the southern states will thus depend to an unknown degree on the effects of this higher production cost on cotton production in other countries. There are many areas where soil and climate are fitted to produce cotton. As far as physical conditions are concerned Brazil has tremendous possibilities as a cotton-growing country. Peru is already an important producer of long staple and of the so-called "rough Peruvian." Many parts of Africa, especially Uganda and the Sudan, are fitted to produce cotton, as are the northern part of Australia, and Mesopotamia. In all these countries, however, the labor supply is sufficient, with resultant high costs. Abundant labor is available in India, and improvement in varieties and methods could undoubtedly much increase the yield of coton. In India, as well as in China, however, the pressure of population is such as to render doubtful any material extension of cotton acreage at the expense of food crops.

Through the quasi-official British Empire Cotton Growing Association, the Manchester spinners have for years tried to stimulate the production of cotton in the British possessions with very limited results, because of lack of labor and consequent high costs. Higher cost in the United States, however, will greatly change competitive conditions of production for the international market. The world will not lack for an adequate supply of cotton. What the ultimate effect of the boll weevil may be as to the share of the world's supply coming from the United States cannot as yet be foreseen.

TORONTO DISTRICT CONDITIONS.

Signs of Marked Business Improvement In Many Directions.

By our Toronto Correspondent.

We come from "walking to and fro in the earth and going up and down in it" and we believe that there are signs of marked improvement in many directions. There's a town nearby dignified with a name associated with "Paradise Regained", where they make very good bricks and have a nice woollen mill. They are starting to work ten hours a day at the brick works and the woollen mills are working day and night.

A certain steady increase in retail dry goods buying is noted, progressive from December, but with an odd sense of flux. There is in other words a need for crystallization. There are not lacking signs that the market is bracing. The rural element in retail buying is becoming a factor increasingly in evidence. The farmer is said to be "getting over his sulks". This shows the inmate good nature of the farmer, for he had many very considerable and satisfactory reasons for getting into a state of grouch, even if some of them had to do with textiles among other things. Very few are gifted with any kind of a real grasp of the sinuosities of cotton, for example. It is scarcely likely, therefore, that the farming profession could have anything other than a misconception of the disparity between declines in soil products and manufactured goods. The fact that the farmer is beginning to come back into the buying column shows that he has sense and good humor enough to prevent removing his olfactory organ at the expense of his presentability.

This progressive movement in dry goods purchasing —marked if not very large—is consistently lowest in the West, better in the centre and best at present in the East. The very poor apple crop in Ontario and the excellent one in Nova Scotia may be factors in that situation; in the West obviously the price of wheat.

A prominent member of the Canadian Manufacturers' Association has promulgated a plan whereby the executives of a large retail business would be distributed among the committees of that Association but as the retail business in question is also one of Canada's largest manufacturing businesses, the prospect of such close cooperation between producer and retailer has started some sort of buzzing in the hives of the wholesale middlemen.

There is being evolved an attitude that on the part of the latter may entail some interesting developments.

The great cost of distribution has been a subject of much introspection of late and there is a tendency to blame the middleman. The middleman who handles a number of different lines per unit of sales staff does not see how the manufacturer can avoid duplicating the cost of handling and distribution when a unit of staff deals with only one commodity.

The textile exhibition had somewhat the effect of introducing a cake of yeast into the general batch of interests and some ferment is going on.

WITH WALSH PLATE AND STRUCTURAL WORKS, LIMITED.

Mr. John Wilson Jr. who for the past fifteen years has been associated with the sales organization of the Dominion Bridge Company, and its subsidiary companies, the Dominion Engineering Works and the Structural Steel Company, has accepted the position of Sales-Manager with the Walsh Plate and Structural Works Limited of Drummondville, Que. Mr. Wilson assumed his new position on March 1st.

How Foreign Exchange Market Operates.

By GRAHAM F. TOWERS

Supt. Foreign Trade Dept., The Royal Bank of Canada.

The premium on U. S. funds in Canada probably has been the most important factor in stimulating public interest in the subject of foreign exchange, a subject commonly supposed to be mysterious and difficult of comprehension, but which in fact does not deserve such a reputation. Any brief description of foreign exchange, and the operation of the foreign exchange market, needs to be divided into two sections, containing material somewhat along these lines:

1.—Reasons for depreciation in the exchange value of a country's currency.

2.—The operation of the Exchange Market.

Reason for depreciation in the Evchange Value of a Country's Currency.

With so many European currencies selling in Canada at a tithe of their former value, it would be impossible to say much about foreign exchange without touching this section of the subject. The Rt. Hon. Reginald McKenna, Chairman of the London Joint City and Midland Bank, has laid down the theory in regard to depreciation in very short order. "The ratio of exchange between any two countries", he says, "is normally determined by the ratio of their general price levels". This theory, at first rather cryptic, on second consideration, becomes clearer. If one country is issuing such a quantity of paper money, unbacked by gold, that the paper money in question depreciates in value, how is that depreciation made visible. The answer is — By a rise in the prices of commodities. Russia is the most extreme example at the present time. A ruble used to be the equivalent of fifty Canadian cents, and before the war it was possible to buy a suit of clothes in Russia for about fifty rubles. Today the same suit would cost perhaps quarter of a million rubles. Now, such depreciation of a currency cannot go on internally, without affecting as well the foreign exchange value of the currency. It would be ridiculous for a Canadian to give five Canadian dollars for ten Russian rubles (the old par of exchange) when those ten rubles would not go near to buying him a Russian newspaper. For his five Canadian dollars, he would want an amount in rubles capable of buying at least the same amount of goods as could be obtained in Canada with five Canadian dollars. The whole thing does not work out to a fraction, but the basis of the theory as stated by Mr. McKenna is clearly sound.

The Operation of the Exchange Market.

The long run exchange value of a country's currency is determined as indicated above, but the day to day fluctuations, in the exchanges of countries not on a gold basis, are determined by demand and supply. It is sometimes thought that the banks or some other agency set exchange rates, or have a great influence on exchange rates: This is absolutely contrary to the facts of the case. The banks and the exchange brokers are simply agents, operating for their clients in the same way as brokers on the stock exchange operate for theirs. The demand for U. S. exchange in Canada, for example, comes from the business men of Canada who have bought something -- goods or securities or services — in the United States, and therefore have to have U. S. exchange with which to make payment. The supply of exchange comes from Canadian business men who have sold something to the United States, and so have a claim on U. S. funds. These people operate almost entirely through their banks. The banks enable the bids and offers to meet. A man in Vancouver may tell his bank that he wishes to sell $500,000 U. S. funds, while another man in Montreal may wish to buy the same amount. If there were no banks these two men would have great difficulty in getting in touch with each other. As the matter stands, however, Vancouver probably would ask Montreal for a bid on the $500,000 U. S. exchange offered by their client. Not for itself, but for the business man in Montreal who wanted that amount, the Montreal bank would make a bid; and the rate of that bid would be determined, not by the bank, but by the man who wanted to buy.

Banks do little exchange business direct between themselves. Exchange brokers, who operate mainly in Montreal and Toronto, are the mediums of intercourse between those who buy and sell exchange on a large scale. These brokers perform only the same functions as brokers on the Stock Exchange. For example, as an individual might tell his stock broker that he was willing to buy 100 shares of a certain stock at 110, so a bank might tell one of these exchange brokers, that, (on behalf of a client) it was willing to buy $100,000 U. S. Funds at 4⅛ p. c. premium. If the stock broker could not find anyone offering the stock wanted at the rate named, he would advise his client that a higher bid was necessary if the stock was desired. The same is true in the Exchange Market. Neither of these types of brokers have anything to do in making the prices or rates. The Exchange Brokers personify their clients (the business men of Canada working through their banks), and thus enable bids and offers from widely scattered points to come together. That the exchange brokers have no place of meeting, does not change the case. They work over the telephone, in the same way as brokers who deal in unlisted stocks, and have no seat on the Stock Exchange.

From the close of the war until a short time ago, the situation of Canada was such that our heavy imports of merchandise, and our requirements for interest payments abroad, set up a demand for foreign exchange greater than the readily available supply arising from exports of merchandise and sales of securities abroad. Therefore, as the situation stood, there was a constant tendency for business men to want more U. S. exchange than was readily available in the Exchange Market. To fill their needs, their brokers had to compete for what was available, and, in their competition, the rate was bid up. Some months ago the tide turned, so far as our exchange with the United States is concerned. A better balance in imports and exports, and heavy flotations of Canadian securities abroad, made the situation in regard to the supply of U. S. exchange a much better one. Offers have been at times more pressing than bids, and the premium consequently has declined.

At the time of writing, February 15th, the discount on our currency in relation to gold amounted to little more than 4 per cent, an excellent record for any country which has endured the financial strain of four years of war and three years of reconstruction.

Preparation of Color Pastes

By RAFFAELE SANSONE.

The preparation of color pastes is an operation that can only be confided to first class people, as it is of great importance in yarn and cloth printing, and if unsatisfactorily conducted can bring a concern to utter failure, even if this is supported through strong capital investments. For such reasons, this operation is well worth studying, with the view of introducing in it all improvements, dictated through years of work in different establishments and through modern technics.

Utilization of old color pastes.—If the color mixer has at disposal old color pastes, left from preceding printing operations, and that can serve his purpose, he weighs the correct quantity of the same, and mixes them together in double cased copper or brass pans heated by steam, avoiding a lengthy boiling, that would only uselessly concentrate the pastes, producing later during the following printing operations shades that are too dark. Should the above residues not be available, or those available not be suitable, the case is more complicated, for he has to prepare new color pastes before he can begin the mixing operations for the production of the required printing colors.

Preparation of new color pastes.—His work then varies in accordance with the colors to be produced, being more complicated in some instances than in others. In the majority of color shops, for simplifying matters, only a limited number of thickenings is prepared, and of these stocks of a certain size are kept, which are replenished from time to time with additions so as to keep them always to the same quantity. Amongst the former a thick paste constituted mostly of starch, and others of less consistance containing British gum, dextrine, gum dragon, or gum arabic are those mostly prepared, as they can be employed to advantage for the production of the majority of printing colors.

Substances facilitating fermentation.—Great care is however necessary in the preparation of these pastes, for avoiding, or retarding, as much as possible their decomposition through fermentation, that takes place more rpidly in warm than in cold weather. For this reason no substance should be placed in the stock or standard pastes that can facilitate fermentation, such as weak acids (acetic acid, sulphuric acid, tannic acid, etc.), or substances tht can produce these by decomposition, for these gradually transform the starch, dextrine or gum thickenings, spoiling their uniformity and rendering them watery, and often even grainy. In many works such substances as arseniate of soda, oil of turpentine, olive oil, zinc sulphate, etc., have been used for this purpose, but the results, although satisfactory in some cases, offer disadvantages in others.

Fat additions.—The writer has seen added to starch pastes, that had to stand for some time, a mixture of olive oil and tallow. These substances while the former was still warm gradually accumulated on its surface and protected it from contact with the air. In this case however, before the paste could be used it was necessary to boil the whole batch mixing well together so as to distribute evenly through the mass of the same all fatty matter.

If used under certain conditions olive oil, cotton seed oil, or deodorised fish oils certaintly offer a good number of advantages for this purpose. If one of these oils were, for instance, placed on the starch thickening when this is cold and has formed a crust it would protect the whole batch from contact with the air, with very little infiltration through the same; moreover, when it is necessary to use the paste, it would not be difficult to draw it off thruogh a small hand pump. This would be of great advantage as the presence of the oil is not always beneficial in the preparation of the color pastes.

Other antiseptic products.—Zinc sulphate is also used to a certain extent for this purpose as it is a powerful antiseptic; it is however not to be recommended for all cases; whereas arenate of soda is to be condemned altogether, owing to its highly poisonous character, for if used in the pastes it finds its way in the prints, and is scarcely ever taken out of the same before sale. For this reason they can be of some danger, especially for many domestic uses. Oil of turpentine and other substances have also found a certain employment for the above purpose, but either owing to their volatibility, or through other inconveniences they have found so far only a small employment. If the quantity of the antiseptic substances employed is not sufficient for stopping the fermentation throughout the whole of the thickening paste to which it is added its presence is quite useless.

Small laboratory trials.—In the above case a certain assistance can be obtained if the question is properly examined in the laboratory on a small scale before making the additions in the bulk. The chemist could store away for the purpose a given weight of the starch paste with a certain fixed percentage, or different percentages, of the antiseptic substance, and use the same at the end of every month for printing trials for verifying if any change has taken place.

Thick starch pastes.—In the making up of the above stock or standard pastes a certain number of precautions are generally necessary, that can vary more or less from thickening to thickening. Thus in the preparation of the thick starch pastes that are generally the base of many of the colors prepared in the color shop, owing to its great cheapness, a small portion of the starch is first mixed in a large copper ladle with a small quantity of water, being crushed by means of a wooden stick till all lumps have disappeared and an homogeneous mass has been obtained. When this has taken place the contents of the ladle are poured into a measured volume of water contained in the vessel, or tub, in which the boiling has to take place, and the operation is repeated until all the starch has been introduced in the former. The water necessary for this mixing is taken naturally from that serving for the production of the paste. After the last portion of the starch has been added steam is turned on, agitating continually the bath till this begins to boil and assumes a clear transparent appearance. During this heating, for avoiding the formation of lumps that takes place very rapidly, the bath is agitated continually either by hand or automatically. When the starch paste has been prepared in the above manner all other additions are made, and the boiling is only continued till a clear mixture has been formed. During this boiling water is added to the bath so as to keep this always to the same height and avoid the production of pastes of irregular strength.

Dextrine pastes.—In the making up of dextrine pastes the formation of lumps of dry material that resist penetration is even easier than in the case of starch, and their

breaking up if they are allowed to form, can only take place through a very lengthy boiling and fairly hard work on the part of the workmen. All this can however be avoided by miging little by little the dextrine in the avoided by mixing little by little the dextrine in the laddle already mentioned with a small quantity of cold water and adding the paste thus formed slowly to the hot water bath.

Other thickening pastes.—With such substances as gum dragon and the mosses the case is thoroughly different for the only way to obtain a proper paste is to allow them to soak overnight in a little cold, or lukewarm, water, and only to warm the bath on the next morning when the required uniformity in the whole mass has been obtained. Gum arabic, on the other hand, dissolves quite easily even if placed at once in hot water, and if it were not for its high price the same would be very largely employed in printing.

Pastes with mordants.—Besides the above other special pastes have to be prepared from time to time that cannot be kept for any length of time without undergoing decomposition. Amongst these are those containing tannic acid, and certain mineral mordants such as acetate of alumina, chrome or iron. In the first instance the tannic acid is incorporated with the starch, dextrine, or other thickening in the form of a water solution, that is acidulated generally with acetic acid, being added slowly, and with constant stirring, so as to form a regular and uniform paste. During this mixing the paste is heated just sufficiently to permit an equal mixing. A boiling should be absolutely avoided, as the tannic acid can easily undergo decomposition into gallic acid if too strongly heated.

A certain number of precautions are necessary in the preparation of tannic acid colr pastes that can be considered amongst the most difficult. They should contain always the correct proportion of tannic acid, and this is only possible if the same is tested regularly before use. For this purpose the chemist could dissolve in separate bths of one litre of water ten gramme samples of the tannic acid pastes taken from the top of the casks that he is informed will be used on the next morning; placing in each solution a sample of one hundred grammes of bleached calico and leaving the same to rest overnight. On the next morning, by fixing in a tartar emetic solution all the samples, on which a number has been printed, separately, and dyeing them in a cold bath of methylene blue of sufficient strength and dilution to produce on the lot a three per cent shade, and rinsing and drying the colors obtained, and comparing them with a standard pattern, that is kept in a close fitting air tight iron box between the sheets of a book, it is possible, after a little practice, to observe at once any difference in shade. In case the shade turns out weaker the color mixer can be informed in time to increase the dose of the tannic acid in his pastes before he uses them for his mixtures.

Pastes with colors.—The preparation of a certain quantity of pastes containing colors is carried out in some works. Unless the same colors are printed over and over again, or at close intervals, a similar practice is more a disadvantage than an advantage, for it is constantly necessary to prepare new colors and the old color pastes stored away cannot always be used in the making up of the same. For this reason it is much wiser to prepare the quantity of each color paste that is just though necessary for the patterns to be printed at the time, and to collect all residues of the same classes of colors in special tubs that are only warmed up to form one color when filled. The paste thus obtained is then used in the matching whenever possible. This plan simplifies greatly the work of the color mixer and saves on the steam and labour that would otherwise be necessary for the warming up of the cold pastes and their utilization in each case.

PENMANS ORDERS ADVANCE.

Shareholders of Penman's Limited, who attended the annual meeting this morning were given assurance by Sir Charles Gordon, the president, that directors fully expect to maintain dividends on the common stock. So far as the bonus was concerned, he would not guarantee its continuance, however, although this was paid during the year just closed.

In spite of the poor 1921 earnings' showing, shareholders were well satisfied with the manner in which the company had come through the year. The fact that it was necessary to draw upon surplus in the year was due to the heavy falling off in orders which the company faced.

Sir Charles referred to the trying year but said that prospects were much improved. Orders in hand were now about $2,750,000, most of which had been received during the last sixty days, compared with about $1,600,000 at this date a year ago. Thus current business in hand was three times as heavy as last year at this time. March, April, May and June last year were extremely dull, but are opening up better for 1922. In reply to a question regarding inventories it was pointed out that last year it was thought that inventories were written down sufficiently, but this was not the case. Indications now were that there would be no further depreciation on this account, however.

Sir Charles said that retailers were passing on a proportion of their losses to the general public, while R. B. Morrice said Penman's lines were not being sold at too high a figure retail.

I, Bonner, the general manager spoke of the excellent physical position of the company's mills. Replacements were continually being made so that the plant was an up-to-date one. Sir Charles stated that in the past five years $1,000,000 had been spent in new machinery and $400,000 in replacements.

Another shareholder asked if the company were buying in any bonds. The reply was that this account remained unchanged, but that they must soon think of retiring some of the issue. He said that just now it would probably have to be done on a six per cent. basis.

Falling prices of textiles last year cut deeply into the profits of Penman's, Limited, whose annual report, presented at the annual meeting held in Montreal to-day, shows that sales for the year amounted to $4,789,052 as against $9,499,180 in 1920, a decrease of 50 per cent.

"Profits for the year," states the report of President Sir Charles B. Gordon, "amounted to $223,855, but as our disbursements for bond interest, preferred and common dividends and bad debts written off, exceeded this amount, we were obliged to draw on our surplus to the extent of $164,510. The first eight months of the year, 1921, showed a continuous falling off in both values and quantities, but during the last four months business picked up considerably, and at the present time shows an improvement over the same months last year."

WOOLLEN INDUSTRY THRIVING.

Large dealers in the Canadian textile trade report that business of the woollen mills in the Ottawa Valley and elsewhere in Canada is booming. They report that practically all the woollen mills of Canada are working at 100 per cent. capacity, with at least three months' orders ahead.

Roving and Spinning Machinery

The Importance of the Little Roving Traverse Motion Behind the Rolls.

By H. D. MARTIN.

There is no more important motion on a machine, than the little roving traverse motion behind the drawing rolls on roving frames, spg frames and mules.

There is no motion which works harder, and upon which so much depends and which is so much neglected. It is not only neglected, but also abused. Moreover there is no motion which can make so much bad work at one time as this important mechanism when not working right or out of order.

In many spinning rooms, this little roving traverse motion back of the steel rolls is constantly making bad work. Why is this? There are several reasons as to why this motion may be causing bad work. First, it may be inoperative. But why should an important motion like this ever be inoperative? And yet this is often the case. It may be stopped for want of being properly oiled or cleaned and perhaps more on these accounts than for any other reasons. It may also be stopped on account of being waste bound. Or some end of good roving may have became entangled around same and put it out of commission. Waste under the steel roll neck may also lift the roll out of gear with the traverse motion. The traverse rod or guide may have became waste-bound so that the traverse motion gear has jumped out of gear, or has had so many teeth broken out of it that it cannot be used again. Sometimes the long lever which connects the guide rod with the traverse motion gear, becomes loosened from the fastening on the rod, or becames disconnected from the pivot of the traverse motion gear. Sometimes even a spinner will deliberately throw the motion out of gear because same ends run aside on the steel rolls. In this case, instead of reporting the trouble to the boss spinner, the spinner may wedge the traverse guide rod in its channel to prevent it from being moved by the motion. This will, of course, cause the motion to get out of gear. Or the spinner may tie the rod or even hit the motion out of gear with a bobbin. For these and many other reasons, the motion may be inoperative.

Secondly, it may be operative, but not properly working. It may be jumping teeth on account of overwarm teeth or the steel roll warm may be wornout. It may be mis-guiding the roving throwing the guide rod too far either to one side or to the other and causing much bad work. Another common evil is where the traverse guide rod has not been properly spaced. It may be spaced all right for one-half of the distance of its length, and for the balance, it will keep gaining and gaining until it is next to impossible to get a proper setting. It will run off on either side the moment it is readjusted. So when this motion is running improperly, it is about as bad as it is to have it inoperative.

Thirdly, the important thing is to have this motion running at all times and to have it running properly. There must be no back-lashing. Often times the fastenings between the motion and the guide traverse rod are loose. The motion is turning, but the rod does not change promptly for the return trip. There is too much play at the fastenings, or the pivot on the motion wheel is worn so much, that the long lever is loose, causing also much back lashing. Another evil which is quite common is where the roving trumpets on the traverse rod are too large for the roving in use. Roving trumpets should really be adjustable to give perfect results. That is: adjustable for the opening. They should be so made that they can be opened larger for coarser roving, and closed smaller for finer roving. As things are now, these trumpets have to be used alike for any roving put thru them.

There is yet another evil. Some of the trumpets or guide rods are not placed closely enough to the bite of the rolls. When they are set too far away, the change from right to left and vice versa is not brought about quickly enough. When the motion reverses, the rod together with the roving should change for the reverse trip the instant that the motion reverses. The trumpet traverse rod should be so correctly spaced that the widest possible traverse is available to use as much roll surface as possible to save leather. This motion should be thoroughly inspected weekly to make certain that it is in good working order. It should be kept clean, well oiled, and properly geared. This is highly important. If this motion is out of order very long, or dwells frequently; it not only makes much bad work, but the destruction of the leather top rolls begins to take place at once. It creases the leather in one place and renders the rolls unfit for further use. Soon as a roll is creased the worst kind of bad work is made, such as lumpey rovings or yarns, thick and thin places, broken ends. And these broken ends in turn break other ends. When these broken ends wind around any of the rolls, other ends are broken besides injuring other rolls. Creased rolls also cause cockled yarn.

Instead of calling this important motion the "little" roving traverse motion, it should be called the "*big*" traverse motion behind the drawing rolls. It should be considered as a big necessity and as well cared for. There is no motion which can repay so well for the good care received as this motion can. It is worth the while to give it the care.

In almost any carding or spinning room, some of these motions may be found either inoperative or improperly functioning. Many a carder or spinner has made himself comfortably established in his new position, by immediately inspecting these motions and getting them into perfectly good working order.

Where there are any old style motions which are not of the latest differentiating type they should be thrown out and the improved motions put into their place. The difference between the old and the new system is that the old style motions always change at the same end or at the same point of contact upon the roll, while the new and improved motions never or rarely change at the same place again. This gives a continuously smooth and regular movement to the roving trumpet carrying traverse rod, and which ensures the best possible results. Any improvement which can be made either with the motion itself, or upon the roving trumpets, will amply repay the management of any mill by giving a smoother and a stronger yarn, and which in turn will greatly improve the finished product of the mill. This motion has made and broken men. Look well for the proper functioning of this wonderful and big motion back of the steel and leather drawing rolls. It is an instrument as important as the regulator or governor on the steam engine.

FAULTS IN CANADIAN WOOL.

(From the Wool Record and Textile World.

How to Improve the Grade of Western Clips.

"The wool from the farms of the provinces of Manitoba and Saskatchewan sold through the wool growers' co-operative organisation and graded by Dominion Government graders has graded lower, been harder to sell, and as a result fetched lower prices than that from other provinces," according to Mr. W. C. McKillican, superintendent of the Government exprimental farm at Brandon, Manitoba. He adds: "Not only is this true when the comparison is made with the range wool, where different breeding and conditions would justify the difference, but it is also true when these wools are compared with the domestic wools of eastern Canada, where the flocks are of similar breeding and are fed under farm conditions.

Faults Due to Poor Methods.

"There is no inherent disadvantage in the climatic or other conditions of these provinces to justify this inferiority. It is due wholly to poor methods in the breeding, feeding and handling of the farm flocks. A few years ago the butter from these provinces had an equally bad reputation, now it takes its place with the very best. That change was brought about by intelligent improvement in the dairy end of farming and butter-making. A similar improvement could be made in the quality of our wool.

"The faults in the wool which reduce the grade are chiefly two — viz., 'burry and seedy' and 'dark.' 'Burry and seedy' is a trade term which covers more than burrs and seeds. Any kind of vegetable matter in the wool will put it into this grade. Chaff is probably the principal offender in western wool, and is very objectionable. It is impossible to get it all cleaned out by any known process. Most of it is removed but the operation is expensive. Some particles remain and get into the cloth. They will not take the dye and make an unsightly blemish in the cloth. Consequently wool buyers fight shy of 'burry and seedy.' In 1920 20 per cent. of the Manitoba and Saskatchewan domestic wool graded 'burry and seedy'. The price of 'low medium combing,' which was our principal grade, was 20 cents; 'burry and seedy' of the same quality brought 15¾ cents. Consequently the loss on this grade was very serious.

Most Difficult to Sell.

"Dark wool has a much more serious fault than mere objectionable colour. The wools that go in this class are not only dark coloured but are weak. Wools of all grades are divided into three general classes, bright, semi-bright, and dark. Most of the prairie domestic wool classes as semi-bright, but about 20 per cent. goes down to dark. This is the hardest wool of all to sell, because this darkness is due to bad conditions which affect the vigour of the sheep while the wool is growing, and is accompanied by weak spots in the wool which become breaks when it is worked, or, in bad cases, the whole length of the wool may be weak, making it very hard to handle.

"The loss on low grading wool is greater than that indicated by the difference in prices. A large percentage of low grading wool from a province gives the whole output a bad reputation and makes the best of it harder to sell. Much that is not bad enough to get into the low grade has a sufficient tendency in that direction to lower the general value of the better grade in which it is placed. On a falling market, as in 1920, the clips having a large percentage of good wool sell first, the poorer ones last, and the spread in price is thus increased over what it would be if all could be sold together.

"At a conference of representatives of departments of agriculture and interested organisations, held in Regina, the following recommendations were made:—

(1) To eliminate burry and seedy wool—

Never allow sheep to run or feed around straw stracks.

Use proper feeding racks tightly boarded to within six or seven inches of the ground so as to prevent chaff getting into the neck and head wool. Use of slanting racks recommended on account of larger capacity and allowing of easier filling, feeding openiings to be six or seven inches vertically and about three inches wide.

If sheep are fed on the ground, never throw feed over their backs. Keep sheep out of the yard while feed is being placed on the ground, providing separate yard in which to confine them while this is being done.

In selecting breeding animals, greater care should be exercised,special efforts being made to get rams and ewes having dense, compact fleeces which will shed chaff and other refuse. This does not necessarily involve cross-breeding but may be practised within the breed now used.

If only the neck and shoulder of a fleece contain quantities of chaff or straw this portion of the fleece should be removed at shearing time and tied and sacked separately. This procedure, however, is not advised where the whole fleece is affected, but is desirable where the removal of a small portion would raise the balance of the fleece into the straight grades.

(2) To eliminate weak stapled dark wool—

Provide sufficient and suitable ration the year round, particularly for ewes while pregnant. Scanty feeding over any extended period materially detracts from strength of wool. If good roughage is not available, some grain should be fed during the winter months and around lambing time.

In breeding, select rams and ewes with dense, compact fleeces of strong staple throughout and entirely free from any indication of hairs or black or dark fibres. Special attention should be paid to the covering on the belly.

(3) Recommendations in regard to general preparation for market—

Remove all tags and dunglocks before shearing.

Clip off all brands either soluble or otherwise.

Shear on a clean floor: do not shear on ground where is any chance of collecting dirt of any kind. Use a large piece of canvas if a floor is not available.

Shear carefully, avoiding second cuts, and keep the fleece in one piece.

Roll fleece with the flesh or cut side out, fold in the sides and commence rolling from the tail. This brings the finest wool on the outside and will frequently raise the fleece one grade.

Use only paper twine for tying fleeces; never use binder twine."

Electric Drive in Cotton Mills

By George Wrigley
J. E. Serrell & Co., Engineers
In the "General Electric Review."

The development of electric drive in cotton mills represents an evolution, from the use of large motors driving groups of machines to an individual motor driving each machine. Since the first textile motor application, about the year 1894, this ideal of individual drive has been clearly seen. Sporadic installations were made, with partial success, but general approval and adoption were delayed until improvements in assembly ,design and details of construction placed it on a sound engineering and economic basis. Electric drive in cotton mills now means individual drive, and only with it can the maximum service be obtained.

The term cotton mills is used here to designate plants in which baled cotton is manufactured into yarn, or yarn and cloth. It is not intended to cover knitting mills, print works, finishing plants or any of the numerous specialty factories for textile conversion.

Until recent years, mill buildings were of standard, slow-burning construction with wooden floors and roof, supported by heavy timbers resting on wooden or cast iron columns and brick side walls. The cost of reinforced concrete as compared with slow-burning construction has been reduced until its excess is now only 10 per cent. It is almost impossible to obtain satisfactory large timbers and modern practice has adopted reinforced concrete construction as standard for practically all buildings. These new buildings are provided with large window openings fitted with steel sash and prismatic glass, are well equipped for temperature control and air conditioning and afford ideal conditions for manufacturing. Small mills generally have one story and larger mills from two to four stories.

Principal departments and processes are separated by partitions or floors. In some cloth mills the weaving is done in a separate single story building usually fitted with a saw-tooth roof and known as a weave shed.

The process of manufacture is one of cleaning the raw cotton, straightening and paralleling the fibres, removing the short fibres, twisting the fibres together to form yarn and, if a cloth mill, weaving this yarn into cloth. In some mills the product is carried through one or more of the finishing processes of mercerizing, bleaching, dyeing or printing, but generally this work is relegated to custom specialty plants.

In the opener room, usually in a section of the outlying cotton warehouse, the bales are opened and the cotton thoroughly mixed to insure uniformity. The material, in small fluffy masses, is carried through a suction pipe to the picker room, and here fed into the first of a series of machines known as pickers or lappers. In these machines, blades or projecting teeth running at high speed beat against the masses of cotton and knock out the dirt, seed burrs and other undesirable material. There are sometimes three successive processes of picking, and the machines are known as the beaters, intermediates and finishers, or as in the best modern practice, the intermediates are omitted.

The product, in the form of a soft batting, called a lap, is conveyed from the breaker to the intake side of the intermediate, where it is combined with several other similar laps so as to obtain equalization. The lap from the intermediate is carried to the finisher and in the same way combined with other laps.

The finished lap is carried by truck or conveyor into the card room and given a further cleaning between the numerous small wire teeth of the cards. These machines perform the additional function of straightening and paralleling the fibres. The material comes from them in the form of a soft, untwisted rope called sliver, which is coiled in large cans and carried to the drawing frames. For the production of specially fine yarns the sliver is passed through combers, where it is given a thorough combing to remove the short fibres. Lap machines, used with the combers, perform the function of putting the material into convenient packages for handling. This combing process is not necessary for ordinary yarns. In the drawing frames the sliver is attenuated, and the fibre further straightened and paralleled. The next process is that of twisting the sliver into the form of roving, a coarse soft yarn. This twisting is started on the slubber frames and the size of the roving gradually decreased and its hardness increased as it goes through two more similar machines known as intermediate and pine frames, or in some cases through a fourth machine known as a jack frame. All four of these machines are classed under the generic name of fly frames.

The roving is placed in the creels of the spinning frames and spun into yarn. Practically all spinning in this country is now done on ring spindles, although a few mule frames are still used for special work. In a cloth mill the filling yarn is spun directly on bobbins and is ready for immediate placing in the loom shuttles. Warp yarn must go to the spoolers, where it is put on spools, then to the warpers where many spools are combined into one very large one known as a warp beam. The yarn on this beam is passed through a slasher where it is given a sizing and then tied-in to the remnant of an old warp and placed on the looms. Following the weaving process the cloth is inspected, folded, baled and shipped to the finishing plant or is finished locally. In a yarn mill the yarn is generally twisted and put in a convenient shipping package, either on a winding machine or in a chain or a ball warper.

If the mill is on the lines of one of the power generating companies it is best to purchase power, if this can be done at the usual reasonable rates. Where such service or local hydraulic power are not available, steam driven prime movers are used. In the older steam driven mills changing over from mechanical to electric drive, the engines are frequently retained, and used to drive generators through ropes. When power is purchased on secondary contracts these engines and generators are operated during low water periods. The generators are installed in small rooms partitioned off from the manufacturing departments and furnished with forced ventilation. Steam turbine generator units are used entirely for new power units in isolated plants. Hydraulic power, where available, can be electrically generated and transmitted to the mill, allowing the main buildings to be placed safely above flood waters. Some of the older hydro-mechanical plants are being changed to electric generation and transmission and, at the same time, efficient water wheels and vertical shaft generators are being installed in place of the old units.

Cotton mill machinery is largely automatic and labor is required principally for attendance on this machinery. Very little increase in production can be brought

about by my enhanced efficiency in the labor. It is only through improvements in operating conditions, machinery and methods of driving it that substantial increases can be obtained.

During working hours the power load is practically constant and the instantaneous load factor much higher than in most industries.

The use of motors in this country has been confined almost entirely to the induction and synchronous types, except that, in the latest developments of adjustable speed applications, commutator type repulsion motors are used.

Large and moderate size motors were the logical choice for the earlier installations, and they were in fact about the only kind then available. Practically the same amount of shafting and belting was used as in the preceding forms of mechanical drive, the heavy head shafting and the belts or ropes from the prime mover only being eliminated. Under the circumstances, the losses in transmission, including motor losses, were generally the same or slightly greater than with mechanical drive and the belt slippage was decreased by only a very small amount. In some cases one large motor only, generally of the synchronous type, was used to drive an entire mill, simply replacing a steam prime mover. Large motors, necessarily low speed, were sometimes coupled to main driving shafts, avoiding the use of motor driven belts.

One practice was to equip a large or moderate size motor with two pulleys at one end and drive in opposite directions. In theory this would relieve the motor bearings of the belt pull since the two opposite pulls would neutralize each other. Unfortunately it was difficult to keep both belts tightened and, of course, one of the belts pulled on top with the slack side below. This practice has been abandoned in favor of a one-belt drive.

In those departments for which individual motor applications have not been perfected, group motors are still used, but the size of units has been gradually decreased. A very satisfactory arrangement is to install a moderate size motor for each line of countershafting, allowing, as it does, the elimination of all counter belts. With several motors in place of one large one, the chances of production loss from motor failure are considerably lessened. By proper standardization, the number of motor ratings can be kept at a minimum and repair parts or spare motors most economically carried. These smaller units are much more easily handled for installation and repairs than were the large ones.

Where it is difficult to secure sufficiently long belt centers, chain drives admirably fill the need. Many of these drives have been in successful operation for years.

Practically all motors driving groups of machines are placed with feet inverted and are mounted on the ceiling. These motors are equipped with slide rails or sliding bases designed for inverted mounting and are bolted to steel motor supports.

The anticipations of increased production and lower transmission losses were not realized with the large, group driving motors and this led to the development of the four frame motor for fly, spinning and twister frame. This four frame motor is equipped with four pulleys, each driving one frame through a belt. This arrangement eliminated all shafting and left only one belt between the motor and the machine pulley. In the earliest forms of this type a standard motor with shaft extended at both ends was used. While fairly satisfactory in operation, its application was limited to new mills or to the few old mills in which the frames could be reset to fit the fixed pulley spacing. Later developments centered on the universal type, in which the shaft is extended at one end only and connected by a flexible coupling to a long shaft running in two bearings. The four pulleys can be located on this shaft to fit any normal spacing of frames. This motor has proved quite popular and is still extensively used. Unfortunately, it necessitates the retention of the one worst belt in the entire transmission system. This almost vertical belt is subject to accumulations of oil and lint which cause excessive and variable slip. With such drives, the belts are generally cleaned once each day and immediately following this cleaning the speed of the driven machine is perceptibly increased. Within a few hours, however, the accumulations of oil and lint will cause sufficient slip to reduce the speed to the pre-cleaned basis. Belts are subject to expansion and contraction due to varying temperature and humidity and due to permanent elongation from the constantly applied fibre stress. When a belt has become sufficiently loose for the machine speed to be obviously low, it is shortened. These effects, while existing to some extent on the large counter belts, are aggravated in the machine belts. The cost of four-frame motor drive for spinning is lower for a new mill than the cost of large motors with belting and shafting and the transmission losses are, of course, somewhat lower.

Individual Drive.

With modern individual drives the question of slip from the motor to the machine is practically eliminated, and production is increased by at least the amount of slip that existed with belts. As a matter of fact textile machinery, designed and adjustted to run at one proper speed, will not operate properly at a lower speed and this results in loss of production which cannot be accounted for by belt slip percentage alone.

In the opener and picker departments individual motors are generally used but are connected by comparatively short belts to the machines. Direct connected motors have been used to some extent, but the motor speeds are not always suited to the speeds of the machines and such an arrangement does not allow changes in speed to fit conditions of operation. No special demand for anything better has been made, as refinements of speed maintenance are not so important in these as in other processes. There are only a few of these machines in a mill and the mechanical difficulties in an improved design are considerable, so that development charges would hardly be warranted by results obtained.

Direct connected vertical shaft motors are sometimes used for vertical openers. The rate of feeding cotton from the opener room to the picker room can be regulated by the use of an adjustable speed motor in the opener room with a controller in the picker room. In one system a mechanical, adjustable speed device is placed between the constant speed motor and the opener feeder, and a small pilot motor operates the mechanical device. The opener room motor speed may be controlled either by hand or automatically from the picker room.

Cotton cards have large diameter cylinders of considerable weight and require for their acceleration a motor with very heavy starting torque compared with its normal rating. A further complication, in the necessity for an occasional low speed grinding operation, has delayed the development of a satisfactory individual motor drive for this machine. Trial installations of such motors have been made and it is probably only a question of time when a satisfactory equipment will be available. The best system at present uses a moderate size motor for each line of shafting.

(To be continued.)

The Irish Linen Position

Can Prices Become Lower?

By ALFRED S. MOORE, M. Text. Inst.

In a recent speech in the House of Commons the Premier (Mr. Lloyd George) stated that "in the present state of the world you need infinite patience to settle anything. The whole nerves of the world are on an edge, everybody is prepared to misinterpret and misrepresent, everybody is suspicious. That is purely an overstrung world. Do let us have a little patience."

Mr. Lloyd George was referring particularly to another critical phase in the interminable Irish Political question, but the same state of affairs most aptly describes the present atmosphere with respect to the Irish Linen Trade.

Affairs seem in a temporarily transitional stage with two great possibilities overshadowing:

1. Either prices of finished fabrics must be advanced or they must remain as they are.

2. Either there will be sufficient flax to provide for all demands made by Linen buyers in the first place, and by Linen manufacturers in the second, or the raw material supply will become exhausted.

At the moment the minds of those engaged in the Linen industry seem about evenly divided in regard to these two sets of "ifs". Hence a little consideration of the pros and cons in these conjoint and parallel problems cannot fail to be of interest.

Finished Goods Prices.

Taking first the question of prices of finished goods, most manufacturers and merchants will admit that quotations to-day do not admit of any encouraging profits being earned. The volume of inquiry is not increasing in the same proportion as many had anticipated, nor is the market falling to pieces as some pessimists had predicted. It is true that the demands from the United States for bleached Damasks, Crash Rollerings, Household linens and goods of similar kinds continue moderately active, and even displaying some increase in volume. Nevertheless, the volume of new business must be described as keeping within small bounds, though there can be no doubt whatever that consumption is increasing, both at home and abroad. So that the fact of cautious buying tends rather to strengthen the market than otherwise.

Union qualities of house hold lines of Bleached sheets do not receive anything like their former patronage, and although sellers have cut their prices down to almost cotton basis, the business is sticky and hard to move.

Government Stock's Sealed

Another hopeful feature of the situation is that the big stocks of Government surplus linens have been decreasing steadily and when it is known that these were sold at quotations below present day cost of production, it means more hope for new orders.

Home Trade Sluggish

However while the state of affairs I have outlined above refer especially to the United States present buying, a similar moderate encouragement also applies to demands for Canada, Australia and our British Colonies generally. In fact, they might be classed as convalescent. The Home trade i.e. business with the British Isles, can only be termed as indifferent and quiet. In fact, just now many merchants would admit that in some cases the orders coming to them are becoming actually smaller in bulk. Undoubtedly if small in size they keep steady, but it would seem that the big retail stores and shipping agents are unwilling to increase stocks and strive to keep them just at such dimensions as will meet their day by day selling, so to speak.

But just as there is a reason for everything, this "ca'-canny" policy might be largely attributable to the financial condition prevailing with many firms through not being able to rely so much as formerly on the help given by the banks, since these latter are insistent on Overdraft being kept within such limits as will mean their ready redemption almost at call.

Much Room for Revival.

Coming to business with other parts of the world, one would rather depict a more roseate complexion than strict truth will permit. South American, and Cuban linen dealing is existent rather than encouraging owing to the adverse exchange rates as well as the fact that these countries are not able to move their agricultural and other products to Europe generally unless at a loss.

Such Belfast salesmen as have journeyed through the Late American Republics, report that irrespective of securing orders, the difficulty has been to collect their accounts.

European Orders Nigh Impossible.

In regard to European countries, the situation may be succinctly summed up so:—French trade hardly existent, Italian very small and only hopeful when exchange rates improve, Spain, although exchange rates fairly reasonable, preference is rather for Cottons, manufactured in Catalonia and the North, while as for German, Austrian, and Russian linen orders business is nigh impossible.

The Prospect of Prices.

So much for a general survey which clears the decks, so to speak, before we reach the problem of future prices. Now any elementary student of Economics knows that restricted outputs must mean higher production costs, and with quotations of Linen goods to-day at figures only affording a minimal profit — if any at all, when every item of cost is accounted for — it surely stands to sense that until linen buying is increased prices cannot come lower.

But can they remain at their present level?

Undoubtedly when stability of prices is at all possible we have a basis upon which trades can be carried on with confidence. Manufacturers, merchants, and retailers are then able to make their contracts with reasonable assurance that the debts created under the contracts will be paid when due in a currency of the same purchasing value as it had been when obligations were assumed.

Are Stabilised Prices Possible?

But all manufacturers do not produce at the same expense so how to arrive at stablised price, which will afford all firms the same, or like, return is a ticklish problem. One cannot expect linen manufacturers to be philanthropists at the expense of their subsistence and comfort.

The Flax Supply.

The flax supply side of the question may be summed up in one sentence.—All depends on the demand. One school optimistically states that there is yet much Irish flax to come into the open. But it cannot be much withal. Frankly, too, it must be opined that unless something more than the present 20s. to 21s. per stone is offered, farmers will not put in seed for any increased crop for the 1922 Season.

Technical Control Of Textile Manufacture

Mechanical Regulation of Atmospheric Conditions Has Afforded Control of Processes More Intricate Than Those of Chemistry.

By J. ESTEN BOLLING.

With the Carrier Engineering Corp. In "Textiles"

The greatest strides forward, in the development of modern manufacturing process, have been initiated by new and improved methods of technical control.

The pyrometer has obviated guess-work in the heat-treatment of metals. Hundreds of delicate indicating instruments control the intricate processes of chemical manufacture. And, in a still broader sense, the mechanical regulation of atmospheric conditions has afforded technical control of processes even more intricate than those of chemistry, processes of drying, oxidation, moistening; in short, all the varied phenomena of aero-physics. This is the age of air. We are beginning to appreciate that the right kind of air is as essential to our manufacturing processes as it is to our lives. We had to learn this by steps, as it were.

First we discovered that air must be heated or cooled for various manufacturing processes. Then we learned that air could be made moist or dry, as occasion required. Then we found that these two factors, temperature and moisture, bore a definite relation to each other and that taken together they determined the effect of the air upon materials in processes of manufacture.

We discovered that the erstwhile mysterious effects of the weather were results of simple physical phenomena. We analyzed weather and we developed mechanical apparatus for manufacturing weather to order. Then began the era of industry technically controlled, so far as weather is a factor. It was about 17 years ago that Willis H. Carrier "discovered" weather, and began the development of apparatus to manufacture it according to the needs of industry.

Today Carrier apparatus is supplying more than four hundred million pounds of made to-order weather per day in more than a thousand of the finest industrial plants in America, representing more than a hundred distinctly different industries, all the way from chewing gum to aeroplanes.

Manufactured weather, in the textile industries, has solved some of the most perplexing problems of the modern manufacturer.

Every milleuin knows that moisture has a marked effect upon textiles—cotton, wool, or silk.

And, since these effects are ably discussed in a previous by published article, the writer will confine himself here to a discussion itself, taking for granted that the need for air conditioning equipment in the textile mill is no longer subject to argument.

The very fact that *moisture* is recognized as the chief essential had led to a misconception of the problem itself.

In the days of vaporizers and steam sprays the dominant idea was moisture. The present-day "moistening head," which atomizes water directly into the air of the mill, is a survival of the idea that the problem is solely one of moisture.

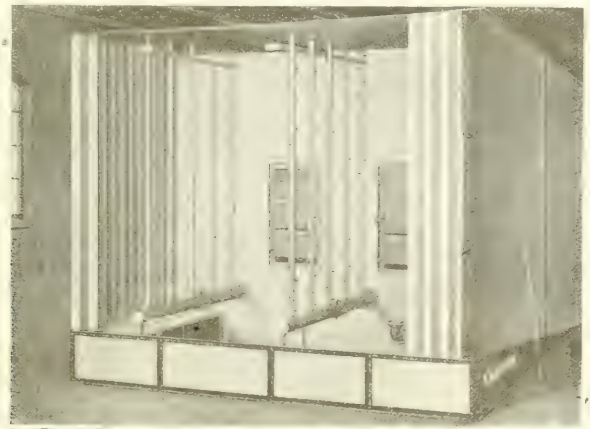

Fig. 1. The Air Eddies are Broken by a Series of Baffle Plates and a Uniform Column of Air, Without "Holes," is Insured.

From the beginning it was thought that the moisture must be conveyed to the materials by means of the air. But it was not until Carrier published his work on psychrometry that the moisture-carrying function of air was fully understood, from both the theoretical and practical viewpoint.

Carrier showed that the moisture-carrying capacity of air depends directly upon its temperature. Air at 85° for instance, can carry 2½ times as much moisture as air at 59°, or twice as much as air at 66°.

Now, the moistening, or conversely, the drying, effect of air depends upon the degree of saturation, or the degree of relative humidity.

It does not depend upon the actual amount of moisture carried in the air.

Since the degree of saturation, or the percentage of relative humidity, depends upon the temperature of the air just as much as it depends upon its actual moisture content, it is obvious that the effect of the air depends upon its temperature, as much as upon its actual moisture content.

Therefore any "moistening" system, such as a head or atomizer system, since it can control only the single factor of actual moisture content, solves only half the problem.

Obviously, an air-conditioning system, to actually control the effect of air, must regulate not only the actual moisture content, but also the temperature, as one is related to the other. This the old-fashion head system is unable to do.

Besides this, the modern conception of air conditioning contemplates two other important factors which cannot be accomplished by means of individual heads located in the mill itself.. These factors are cleanliness and uniformity.

In the Carrier System of Conditioning all of the air is cleaned before it enters the mill, removing dust and fly;all of the air is moistened before it enters the mill, preventing the rusting of machinery due to water not vaporized; all of the air is heated before it enters the mill, insuring positive control; and all of the air is distributed with absolute uniformity because it is delivered to the mill under a slight, but positive, mechanical pressure and kept constantly in motion.. This prevents "dead" spaces, either too moist or too dry.

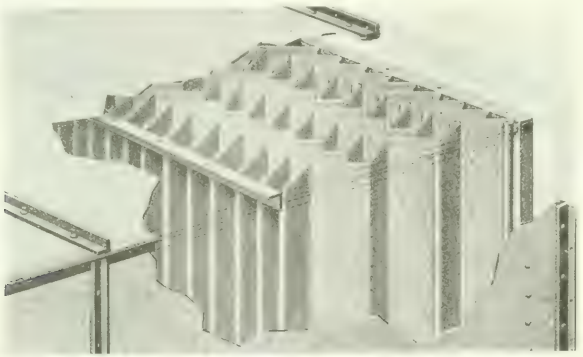

Fig. 2. At the Right End of the Spray Chamber the Air Passes Out Through a Seres of Eliminator-Scrubber Plates.

An Experiment.

To make this clear, suppose we consider this illustration. The air in a mill is like a great blotter.

Place a blotter on your desk pad and drop upon it a small quantity of water. Note that the area upon which the water falls is immediately supersaturated, that is, more water is present than can at once be absorbed by the blotter, some of it remaining upon the surface as a liquid. The excess moisture begins to spread slowly. Note that the outer edges of the spreading area of moistness is but slightly damp and that the degree of moistness increases as the center of the area is approached, varrying from complete dryness just beyond the edge of the moist spot to supersaturation at the center.

This is exactly what happens when water is atomized into the air from a moistening head or "vaporizing" nozzle, except that the water in the air spreads outward in all directions, while the water on the blotter spreads in a given plane.

From this illustration it is readily apparent that the direct head system cannot moisten air uniformly throughout the immense areas of the modern textile mill.

Now, if you will take the same blotter, dip it quickly into a pan of water, and shake from it all of the excess water, you will find that the whole blotter is evenly saturated with water—fully saturated throughout its entire mass, and yet there is no excess water because you have removed that by merely shaking it from the blotter.

As near as the writer can picture it, that is the story of the Carrier System of Air Conditioning, or, as it is beter known, that is the way weather is manufactured with Carrier Apparatus, completely and uniformly saturated with water vapor, and yet free from any excess water present as a liquid. (It is the water which is not vaporized, but remains unabsorbed, as a liquid, that causes machinery to rust and wood to rot.)

The simplicity and sureness of this process can be seen by referring to Fig. I. The air enters the machine at the left through a series of baffle plates which break up eddies and insure a uniform column of air, without "holes." It then passes through the spray chamber, in contact with the water mist from the bank of spray nozzles. This mist, as shown in Fig. 2, completely fills the interior of the chamber so that all of the air is washed clean, and moistened or, more properly, humidified uniformly.

The excess spray water falls to the bottom and is collected in the settling tank, from which it is again pumped to the nozzles. The pump inlet, as tank is screened to prevent the passage of dirt or fly.

At the right end of the spray chamber, the air passes out through a series of eliminator-scrubber plates.

From the humidifier the air passes to a heater, or a series of individual heaters, in some cases, and is brought to the proper temperature before it enters the mill.

The air which enters the mill is, then, clean, uniformly moistened or humidified, heated to an exact and predetermined temperature, and delivered to the mill without drafts but with mechanically positive distribution.

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When both temperature and actual moisture content are controlled, the relative humidity is controlled.

This is known as the Carrier Dew-Point Control sometimes called the Dual Control. It is patented and can be obtained only from the Carrier Engineering Corporation of 39 Cortlandt Street, New York City.

The operation of the controls, the simple and durable instruments employed, the details of the apparatus and a complete description of its application in the textile mill, are contained in a well-illustrated booklet which can be obtained from the Carrier Engineering Corporation upon request. Bulletin 1035.

Besides its function of humidifying and heating during the winter, a Carrier System provides an inexpensive method of cooling the mill during the summer. The cooling is accomplished by the same apparatus, without change or addition. One of the control instruments is switched over from the heater valves to automatic volume regulators. This shift is made automatically,as required, so that the system operates automatically throughout the entire year and always at maximum effieneey.

The method of Cooling by Evaporation, together with an interesting story of Manufactured Weather, is contained in a bound volume which, also, can be obtained from the Carrier Engineering Corporation, without charge upon request.

These two books, Bulletin 1035 and "**Weather**" will prove a valuable addition to the library of anyone interested in the production of textiles.

MANILA HEMP MARKET

The hemp market at Manila is firmer according to advices received from there and the demand is good, with prices a shade higher. Stocks of hemp are said to be of not very liberal proportions, and the market outlook is described as brighter. The result of the advancing tendency is that the large rope makers are inclined to purchase ahead to a greater extent. Mexican sisal at New York has not shown any important changes. Buyers are inclined to take supplies in a fair way, but are reluctant to purchase other than sparingly. Jute is in a little better call.

MISS O'NEIL ON WOOL INDUSTRY.

Members of the Canadian Business Women's Club enjoyed a talk last week on the development of the wool trade in this country, the speaker being Miss G. O'Neill, Secretary of the Canadian Co-operative Wool Growers, Ltd. Miss O'Neill traced the industry from its earliest stages in 1675, when less than 1,000 sheep were raised in Canada, down to the year 1917, when the Co-operative Wool Growers, Ltd., was formed. Last year, she stated, 4,000,000 pounds of wool raised in Canada, was sold to the Canadian trade. Beautiful samples of weaving from Canadian wool were shown.

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Send for our Layout for Textile Mills. It is interesting information anyway, and may prove useful to you.

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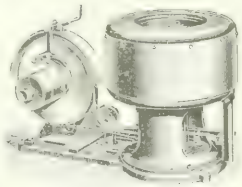

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INDEX TO MILL SUPPLIES — Continued

Spoolers:
Draper Corporation.
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Spindler, E. O.
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Jefferson, Edward.
Leigh & Butler.
Whitin Machine Works.
Saco-Lowell Shops.

Transfers, Gold:
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Steam Specialties:
Sargent's, C. G., & Sons.
Canadian Johns-Manville Co., Ltd.

Steaming Machines (Open):
Gessner, David.

Steaming Outfits (Vacuum):
Gessner, David.

Steel Paint:
McArthur, Irwin, Limited.

Strap, Lug:
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Stretchers (Cloth):
Gessner, David.

Stop Motions:
Wildman Mfg. Co.

Sweater Machinery:
Dubied Machinery Co.
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Tompkins Bros. Co.
Spindler, E. O.

Tanks, Tubs and Vats:
Klauder-Weldon Dyeing Machine Co.
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Jefferson, Edward.

Tartar:
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Atteaux Dyestuffs & Chemicals Co., Limited.
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Teazle Gigs (Rolling):
Gessner, David.
Jefferson, Edward.
Sharpe C. A. Ltd.
Stephenson, Harry.

Textile Soap:
McArthur, Irwin, Limited.

Tops, Noils and Waste:
Andrews, H. V.
Canadian Wool Company, Limited.
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Holdroyd, Harry.
Julius Cohen & Josephy.
Wardlaw, T. D. & Son.

Toque Machines:
Tompkins Bros. Co.

Transfers, Dry:
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Trucks:
Diamond State Fibre Company.

Underwear Machines:
Dubied Machinery Co.
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Varnish:
Dominion Paint Works, Limited.

Ventilating Apparatus:
Philadelphia Textile Machinery Co.

Wadding Machinery:
Tatham, Wm. Ltd.

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Crompton & Knowles Loom Works.
Draper Company.
Saco-Lowell Shops.
Stephenson, Harry.
Leigh & Butler.
Jefferson, Edward.

Warping and Beaming Machinery:
Crompton & Knowles Loom Works.
Draper Company.
Jefferson, Edward.
Leigh & Butler.
Saco-Lowell Shops.
Stephenson, Harry.

Warp Stop Motions:
Crompton & Knowles Loom Works.
Draper Company.

Washers (Back):
Jefferson, Edward.
Leigh & Butler.
Sargent's C. G. Sons Corp.
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Washing Machines (Full Width):
Gessner, David.

Water Rectification:
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Dominion Paint Works, Ltd.
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Water Softening Plant:
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Scaife, Wm. B., & Sons Co.
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Water Cooling Apparatus:
Gessner, David.

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Whizzers:
East Jersey Pipe Co.
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Foster Machine Co.
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Gessner, David.
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Wool Openers:
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Jefferson, Edward.
Stephenson, Harry.

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Dominion Paint Works Ltd.

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Sargent's, C. G., & Sons.
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Wool and Waste Dusters:
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Woolen and Worsted Machinery:
Crompton & Knowles Loom Works.
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Foster Machine Co.
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Sargent's, C. G. Sons.
Saco-Lowell Shops.
Whitin Machine Works.

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Stephenson, Harry.
Jefferson, Edward.
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Andrews, H. V.
Benson, W. T. and Co.
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Holdroyd, Harry.

Yarn Conditioning Machines:
Stephenson, Harry.
Jefferson, Edward.
Sargent's, C. G. Sons.

Yarns, Cotton:
Dominion Textile Co., Ltd.
Hamilton Cotton Co., Ltd.
McConnel & Co., Ltd.
T. D. Wardlaw & Son.

Yarn Dyers:
Stephenson, Harry.
Dominion Textile Co., Ltd.
Hamilton Cotton Co., Ltd.
Wm. B. Stewart & Sons.

Yarn Dryers:
Stephenson, Harry.
Jefferson, Edward.

Yarns for Elastic Manufacturers:
Dominion Textile Co., Ltd.
Hamilton Cotton Co., Ltd.
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Forbes, R. Co., Ltd.
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Yarns, Glazed:
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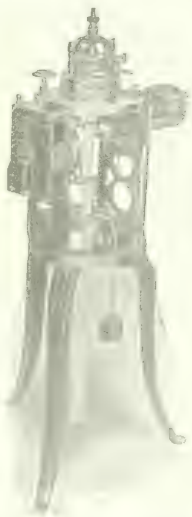

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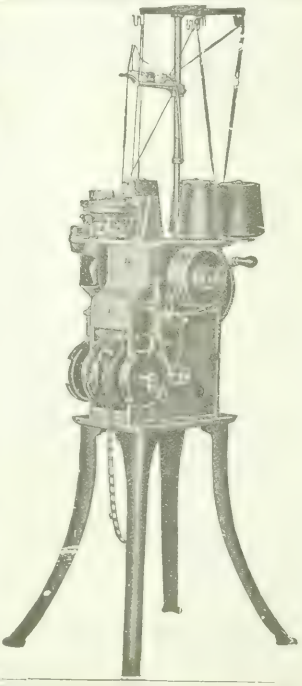

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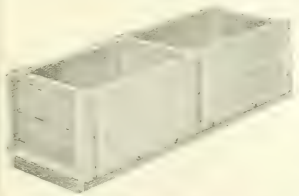

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ALPHABETICAL LIST OF ADVERTISERS

Page

A

Ackroyd Bros. 71
[illegible] .. ..
[illegible] .. ..
Atlantic Dyestuff & Chemical Co., Ltd. The .. ..

B

Barnes, John W. Co. .. ..
Bemis, W. T. & Co. .. ..
Borradaile Supply Co. Ltd. .. .. ..
Borne, Scrymser Co. 16
Boston Belting & Supply Co. .. .. ..
British Dyestuff Corporation, Ltd. ..
Brodersfield, Ltd. 76
Brooks & Doxey .. ..

C

Canadian Co-operative Wool Growers Limited 22
Canadian Link Belt Co. Ltd. ..
Canada Spool & Bobbin Co., Ltd. .. 22
Canadian Salt Co., Ltd. .. ..
Canadian Wool Co., Ltd. .. ..
Can. General Combustion Co., Ltd. ..
Clay, Joseph & Co. 1
Clay, Ferns & Co. 17
Cohen & Josephy 1-24
Crabb Wm. Co. .. ..
Crane Ltd. .. ..
Crane Mfg. Co. .. ..
Crompton & Knowles Loom Works ..

D

Diamond State Fibre Co. of Canada, Ltd. .. ..
Dickinson Dye Works, Ltd., The .. 21
Dominion Dyed Wool Co. .. ..
Dominion Textile Co., Ltd. 8
Dow Chemical Co. Ltd. .. ..
Draper Corporation 2
Dupont Machinery Corp. Ltd. .. .. ..

E

East Jersey Pipe Co. 19
Eastman Machine Co. .. ..
Empire Wool Stock Co. 21
Eze Manufacturing Co., Ltd. 21

F

Fawcett, Richard & Co. 14
Fletcher, H. O. Ltd., The .. ..
Foster, J. B. Co., The .. ..
Franklin Machine Co. .. ..
Frankl.n Machine Co. 3

G

Garland Mfg. Co. 1
Geigy Co., Inc. 18

Page

Gilmour, David 11
Gould, Shipley & Moir Co. Ltd. .. 81
Guelph Carpet & Worsted Spinning Mills, Ltd. .. ..
Grasselli Chemical Co., Ltd., The 82

H

Haigh, H. & Co. 18
Hamilton Cotton Co. Ltd. .. ..
Harley-Kay, Ltd. 14-15
Harris Abattoir Co., Ltd., The 12
Hebert Paper Box & Shook Co. Ltd. .. 10
Holdroyd, Harry & Co. 18
Holliday, L. B. & Co., Ltd. 73
Houghton Wool Co. 19
Hughes-Jones Machinery .. ..
Hussong Dyeing Machine Co. 18

I

Imperial Dominion Carpet Co. .. .. ..
Imperial Trading Co. .. ..
Indian Head Industries, Inc. .. .. ..
Industrial Specialty Mfg. Co. Ltd. 16
International Business Machines Co. Ltd. .. ..
Ive, Edwin 19

J

Jacobs, E. H. Mfg. Co. 21
Jacques, Wolf & Co. 20
Jefferson, Edward 21
Jones & Glasco, Ltd. .. ..
Joseph Clay & Co. 17
Joplin Cotton & Josephs 24
Jute & Cotton Feed .. ..

K

Kenyon Co. .. ..
Klauder-Weldon Dyeing Machine Co. 16
Klipstein, A. & Co. 16
Kohler Bros. & Co. Ltd. .. ..

L

Lawrason, S. F. & Co. 13
Lamb, J. K., Textile Machinery Co. 81
Leigh & Butler .. ..
Lever Bros. Limited 13
Longclose Engineering Co., Ltd., The 18
Lowell Shuttle Co. 81
Lowell Bobbin Co. .. ..

M

McArthur Irwin, Ltd. .. .. ..
McConnell & Co., Ltd. ..
Mather & Platt, Ltd. .. ..
Marston, John P. Co. .. ..
Metallic Bearings Co. Ltd. .. .. ..
Merrow Machine Co. 23

Page

N

National Aniline & Chemical Co. Ltd. 10
Newbert Color Co. .. ..
Nichols Chemical Co., Ltd. .. ..
Newport Chemical Works, Inc. 14

O

P

Parkhill Company, The 6
Pollack Bros. & Co. .. ..
Procter & Schwartz, Inc. 15

R

Ramsay, A. & Son Co. .. ..
Refinite Co. of Canada, Ltd., The .. ..
Rhode Island Humidifier & Vent Co. 85
Richard Haworth & Sons 14
Roessler, Hasslacher Chemical Co... 72
Roy, B. S. & Son Company 24

S

Saco-Lowell Shops 83
Sargent's Sons Corporation, C. G... 12
Scott & William, Inc. 85
Sharples Co. A. Ltd. 81
Spindler, L. Co. .. ..
Stafford Co., The .. ..
Stafford & Holt .. ..
Steel Heddle Mfg. Co. 15
Stephenson, Harry 15
Stowell Wm. E. & Son .. ..

T

Taylor, Chas. F. 21
Textile Processing Co. Ltd., The .. 75
Tolhurst Machine Works 23
Tompkins Bros. Co. .. ..
Torrington Co., Ltd. 26
Toulmin & Sons, Ltd. .. ..
Turnbull Co., The C. 78

U

Universal Supplies, Ltd. .. ..
U. S. Ring Traveler Co. 84

W

Walton Mfg. Co. L. S. 11
Walton Loom Works Co. 85
Wardlaw, T. D. & Son 17-18
Weatherwax, W. J. & Co. Inc. 4
Whitehead, Emmans, Ltd. 19
White Machine Works .. ..
Wilcox & Gibbs Sewing Machine Co. .. ..
Woodman Mfg. Co. 80

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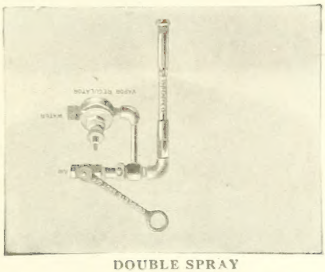

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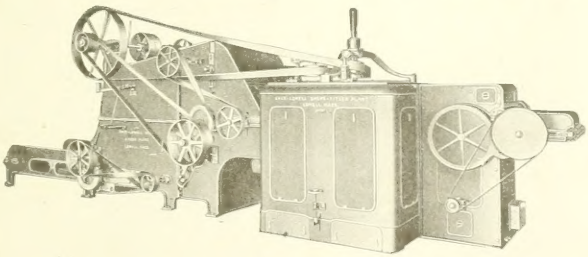

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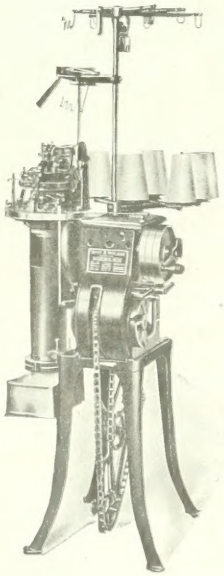

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